Panther Science Fiction

SHIPWRECK

Charles Logan

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CHAPTER ONE

Lonely, frightened and tired, Tansis knelt by the grave, his hand clutching a spade which he held upright in front of him like a staff to help him to climb to his feet. Four graves, four burials of friends he had known all his life, radiation deaths long and painful without hope of cure. All over now. No more nursing and comforting. All dead.

He squinted at the glaring white sky which hid all hint of stars and moons and the faraway Sun. He would never see that faint point of light which was his home star, never again meet another human being. He thought of his own death, now a familiar subject carefully pondered, a comforting centre for his own self-pity. He had sleeping pills. Any time he chose he could take that carefully measured overdose and end this nightmare.

He remained kneeling. It was a tiring world in which to get on to your feet, with everything a fifth heavier, and that extra gravity was beginning to sink in and drain away all further effort.

God – what could mankind do in a universe like this? It was plain the universe didn't care. This was the ninth failure. The ninth attempt to find anything like Earth-somewhere-else. But this was the most disastrous attempt, doubly disastrous for himself for he was still alive, still suffering, still waiting for the next chapter of accidents to finish him off.

How could the expedition ship have blown up and been destroyed so totally? Sixty-five years of near-perfect flight, seven thousand nuclear blasts jolting the vessel up to its maximum speed. Two generations of coasting between the stars. He had been born on that ship. His eyes filled with tears and his chest racked painfully. He might as well cry like a baby – who could see him? Mother and father dead, his sister dead, their home all burned and gone.

Another seven thousand bombs detonated in one month at the gates of the Capella system to bring the ship down to

the same pedestrian pace that the solid part of the universe seemed to prefer, and there had been one final manoeuvre to bring the ship into orbit around the white planet, the sixth from the primary. One nuclear device out of fourteen thousand, one rotten apple in the barrel, had detonated prematurely a fraction of a second away from the detonation point at the focus of the great tungsten-titanium shell that took the blast and heat and in reaction moved the vessel onward.

The shell had cracked, the ship, perched on its back, had its lower half shattered and the upper half seared with radiation, and that was that. The universe then proceeded to deal mercilessly with this glowing chunk of matter without regard for the people who were still dying in it.

Tansis saw yet again in memory the shell breaking up under inertial stress as the vessel spun and rolled far too fast. Saw yet again the pieces moving and winking in the harsh light of Capella as they radiated away past his scout vessel. He saw the main ship – his home – break loose from the shell, glowing pieces falling away from its rear end.

Numbly he had sat in the control seat of his small scout craft, watching, detached in the silence of the event, then in panic he forgot his pilot's training and rushed the boat towards the stricken home-ship, overshot at an awkward angle, and spent a sweating hour matching velocity. He wished that he hadn't. He had often wished that he hadn't in the past ten weeks, and then felt guilty. After all, he had rescued four people and brought them down here, if you can call dying somewhere else a rescue. He had done what he could even if it didn't mean a damn now. But he wished that he hadn't entered the ship. That inferno in darkness. So many dead people he couldn't recognize, ruins and glowing debris he couldn't place. It was not his home, not the place of his childhood: that had gone as surely as Earth had gone, back into the light years of the past.

The planetary entry vessel docked on the forward end of the main ship had been shielded from the blast. He could never remember clearly how he had got the four survivors into it. undocked it and corrected its spin, brought it into entry configuration and guided it down to this planet. He

must have, though – the others were in too deep a state of shock to have done all that. Looking back, it was all part of the disaster, as if the blast of that maverick bomb had yanked him into the ship and hurled him out again and landed him on to this bluish-green prairie under this glaring sky.

He didn't know what to do now. He felt as if he had finished his work and now he should go home and rest; and then piercingly he realized that there was no end to this situation, there was no home-time. He had been so busy in the last ten weeks looking after the others, so immersed in their needs, that he had been detached from himself. Now loneliness and lack of purpose closed in on him.

He felt thirsty and sweaty and his back ached. He could have a drink and a shower and get this bloody suit off, yes, get out of this thing. He climbed painfully to his feet and limped towards the planetary landing ship, wondered what this world was like without a protective suit. He hadn't had time to run tests on its habitability, and had not dared to go out unless he was totally insulated and breathing from air tanks.

He might be less depressed if the scenery were more interesting, but he had chosen safety and had landed in the flattest and most open country he could find in the temperate latitudes. So far he hadn't noticed any weather, just featureless thirty-two-hour days, same white sky, no wind, no rain. Outside temperature on his suit thermometer was around thirty degrees centigrade, a hot summer's day back on Earth.

The only centre of interest was the ship itself towering upwards; the rest was a dead flat bluish-green plain without anything to mark off distances. Sometimes it seemed to him as if he could step to the horizon in a few paces, at other times he felt like an ant on a ballroom floor. Just now he felt like an ant and cared for nothing but the ship and getting back inside it.

Once inside the ship and out of his suit he felt better. Half his trouble was agoraphobia; after all, he had been born and raised inside a space ship, and the landing vessel was a bit of home – same subdued lighting, same padded

furniture, polished panels, every service at the press of a switch.

He busied himself making coffee, and decided to have a square meal even though he didn't have much of an appetite.

He felt strangely free, even though the loneliness lurked like a wolf at the edge of his thoughts. He could do what he liked, have what he liked, no need for rationing.

He turned on a record player full volume, something he had never dared do in his life. Brahms' violin concerto filled the ship while he ate. All too soon the music ended and loneliness poured upon him. He dialled another tape and prowled round the ship deciding to do this and that and too dispirited to do any of it. He stood moodily for a long time in the assembly cabin among the empty unpopulated couches, and then suddenly went to his bunk, got undressed, and almost instantly fell asleep.

It was still daylight when he awoke and he still felt tired, or perhaps it was the next day, which meant that he had slept at least twenty hours, but he didn't bother to check. He got up quickly mainly because he felt lonely and had to move about and do something. The silence was unbearable and had to be stopped. He ordered the ship's computer to keep a constant background of music going from a random selection of tapes. He had breakfast and found he was ravenously hungry, and then sat in the assembly cabin drinking one coffee after another. He felt he was living like a millionaire, or like the last man on earth, free to help himself to anything he wanted. Then boredom and purposelessness settled on his shoulders again. He began to think of how and when to end his life with those pills, and went to have a look at them. He stared at the featureless scene outside, and suddenly made a decision.

He went up to the command cabin and ordered the computer to put on screen the photo-maps of the planet which it had made during entry. They were far from complete, he found. The ship hadn't orbited the planet completely on its entry, and only about two-thirds of the northern hemisphere was mapped. A picture of the planet as a whole was missing.

He remembered then that he had only ordered the mapping procedure late in the entry operation. God knows he had had enough on his plate at the time. All the comprehensive survey of the initial reconnaissance was still up there in the computer of the scout ship or in the wrecked main ship, and both were now a hundred thousand kilometres above his head and probably heading for Capella and a glorious end.

He did his best to remember the overall topography of the planet, and drew it freehand as best he could while his memory was still fresh. At any rate he had good maps of where he was standing. The ship had crossed an ocean larger than the Pacific and landed in the western half of a continent which had a coastline vaguely like China's, with an enormous river system as big as the Amazon which was ringed right round with gigantic mountains north, east and south. The last of the maps looked eastwards across the continent and showed a tremendous vista of heaped-up mountain-ranges like Tibet. The ship had landed on high plateau country east of the main river basin where it began rising into the tangled mountainous centre of the continent. Most of the river basin and the coastal lands were covered with forests.

He wasn't going to stay on this wretched plateau any longer. He decided to name it 'Limbo', and to hell with it.

The entry vessel had plenty of fuel left – enough to get back to the main ship, but that was of academic interest now. He could go round the world at least twice, and might do that eventually, but for the moment he was going to change his scenery. He examined the photo-maps of the great river basin in the west, looking for clear patches among the forests and anything interesting. From the earlier survey he already knew that there was no evidence whatever of civilization. No roads, no cities, no cultivation anywhere, and presumably no sentient inhabitants unless they were primitive hunters and gatherers. At the moment this seemed unimportant – he was looking for new scenery like a tourist wondering where to go next.

A perceptive friend could perhaps have told him that what he was really doing was fleeing from the experience of the last ten weeks – the suffering and death, the whole

tragedy of the disaster, fleeing from the graves, from the silent lonely empty plain which had been like a stage set for a particularly gloomy and pointless play. Anyway, it gave him something to do, and it was with surprise that he found three hours had gone by.

His tiredness returned. Even sitting down in one and one-fifth gravity made for aches and pains unless he kept shifting about. He lay down and dozed, dreaming and half-waking. It was unpleasant, and he was dispirited again when he finally got up, wondering whether it was worthwhile to bother moving at all, wishing there was someone he could talk to. He noticed he was talking to himself.

He went across to one of the six observation windows in the circular assembly cabin and looked at the graves, which he had marked with square insulation panels stuck upright in the ground like tombstones. He decided he ought to write their names on them, and dialled the computer for the location of paint. The answer screen gave a negative sign. Of course, why should it have paint? He thought about the problem of how to put names on insulation panels, and dialled again for the location of adhesive insulation tape. There was some of that, small stuff for sealing sample jars.

Taking a roll of it and a pair of surgical scissors, he went to the air-lock. As he stepped inside a warning note sounded. The information screen inside flashed 'CHECK YOUR PROTECTIVE SUITING'. He swore with exasperation. He had forgotten to suit up for outside, and the computer, with wires to every part of the ship, knew that a suit had not been removed from its locker while the exit port had been activated. He suddenly felt relieved, and laughed for the first time in weeks. The computer was looking after him. Something cared even if it was only a machine. He tapped out his answer on the keyboard, 'Thank you, kind sir', then, suitably protected, emerged from the ship and dropped down to the charred ground on the hydraulic platform.

As he walked towards the graves he began to worry again. He couldn't remember for sure which grave was for which person. He searched his memory of the past confusing weeks. Vassily had died first, about a week after Tansis had amputated his leg without any surgical knowledge except

what advice he had got from the computer and the instructions on the medical packs. Poor Vassily, he should have left him alone and filled him with pain killer. Vassily had blessed him before he died, but Tansis felt guilty at the memory of digging up his leg and burying it again with the body.

Which was the first grave he had dug? He wasn't sure whether he had buried the navigation officer to the left of Vassily or the right. Macintyre had never regained consciousness after the first three days, and Tansis couldn't really remember the circumstances too well. He knelt in the black ashes which covered the ground near the ship, and felt the pointlessness of it all again. If he was going to die soon who would see the graves or care who was there? Another expedition might come seeking to know what had happened to the first, but not in his lifetime, that was certain – not when Earth was sixty-five years away. But another expedition would see the graves, and that was reason enough for naming them.

He started with the last grave, cutting the tape and sticking it on to make square letters. It was fiddly work using scissors in gloved hands, and the tape stuck to everything. He made a decision about the first grave and put the name on, and then worked through the rest. He thought about an epitaph. Fragments of poetry and scripture floated through his mind. Finally he wrote in tape, 'The path to the stars is filled with sorrow'. That summed up his mood and gave him a grim satisfaction. The universe was a bloody awful place once you left the cradle of Earth.

That was all he could do for his four friends. He had done his best. Then another thought troubled him. How could another expedition find the graves? It could find the landing vessel because this could be programmed to broadcast as soon as it received any meaningful radio signal even years after he was dead. As long as the power source and batteries lasted – and that should be a century, if everything else in the ship was switched off – another ship would soon home in on the broadcast. But he was going to take the ship somewhere else. Should he stay here instead? No, no,

perish the place – he couldn't live like a tombstone himself, he had to get out.

When he got back inside the ship he programmed the computer to broadcast a map of the continent showing the position of the burial site with a cross and a statement of who was buried there. This was to be broadcast as soon as meaningful signals from a spaceship were received. That took care of something for at least a century, but what about now?

He had a meal and then watched a film. It was still early afternoon. This planet had interminable days. Should he go now? He pottered about the cabin, tidying up and cleaning, putting off the decision. He felt he couldn't just up and go, there ought to be preparations. So he tidied up the control cabin and the laboratories, then, carried away by his busyness and convinced that the place needed to be fully sorted out and shipshape before he could go anywhere, he set about checking the stores and then all the systems of the ship with the computer. The ship was indeed very untidy, with stores opened and strewn about where the haste and impatience of the last ten weeks had left them. He kept the background of music at full volume and enjoyed the dialogue with the computer as he checked the items.

He went to bed feeling very tired but quite pleased with himself, and fell asleep with the music of Sibelius surging around him.

He awoke feeling refreshed and impatient to set out. It was still night. A thirty-two-hour cycle was going to take a lot of getting used to. He wasn't going to travel in the dark, and he would be travelling westwards back into the night. His spirits began to ebb again: there was a lot of time to fill on this damn planet. He looked at the maps again, and decided to land on the banks of the principal river in the centre of the basin, choosing an area of scattered forest and clear ground.

He went down to the next level where the labels were, and started an analysis of the atmosphere outside. What he knew about this planet wouldn't fill a sheet of notepaper.

He knew from the advance probes sent out by the main

ship before it made that final and fatal manoeuvre that the white planet had an earthlike atmosphere, 55% oxygen, 44% nitrogen and 1% carbon dioxide. Atmospheric pressure was slightly higher than on Earth. Eight-tenths of the planet was covered with deep oceans, and cloud cover was complete and permanent, with evidence of powerful convection currents moving out from the tropics. The axial tilt was 37 degrees, and the polar ice-caps were massive. The year was 979 terrestrial days, and the planet orbited its mighty double primary at a mean distance of 250 million miles. The climate should have great seasonal extremes.

The ship's computer didn't know any of this because the preparation of the entry ship for the initial exploration had scarcely begun when disaster struck. All the detailed information was in the main vessel computer, and that was now heading for oblivion. What he needed to know was whether the air was full of micro-organisms and dust, and whether he dared go out without protection.

Dust level, he found, was low, which was understandable, for this plateau must be at least eight thousand feet up. He didn't know any height precisely because the air pressure was different from Earth and no altimeter had been calibrated for this place. It never would be now unless he did it himself. There were no heavy metals or other toxic elements in the air, but micro-organisms were present, particularly viruses and large complex organic molecules. The molecules could be the scent of ubiquitous, ribbon-like vegetation, and he wondered what it smelt like. These molecules were alkaloids, but were not the same as those known on Earth – at least, the computer couldn't match them. He had only a general scientific training as a sort of helper and handyman when he wasn't piloting, but the computer was specifically designed and programmed for just this sort of work. He was confident that if it couldn't match a molecular structure with its memory bank, then it wasn't known on earth.

His next task was to analyse the various micro-organisms and viruses in the air samples. The apparatus and techniques were able to do this, but he hadn't the experience to handle them. He had to sort the organisms out before he could test them on human tissue culture and analyse the results to see

if the reaction was malign. He just didn't have the expertise. A handyman's knowledge simply wasn't enough when his life depended on the answer. The job would have taxed a team of biochemists and microbiologists, for it was all unknown ground.

Sadly he abandoned the task, undecided whether or not to make a study of biochemistry and related subjects, using the computer as teacher. But there was so much exploration to do, and he didn't have a lot of time left – perhaps a year before the ship's supplies were used up. Why bother becoming a student? At the back of his thoughts was a self-chosen death when the going got too rough. Why bother grappling with every problem? Better to hop about the planet in the ship, seeing as much as he could and learning what he could on the way, and keeping his protective suit on whenever he went outside. It was day now, or at any rate near the end of the long dawn that this place had. A combination of a long rotation, a cloud-covered sky and high latitude meant that dawn and sunset lasted two hours with an imperceptible rate of brightening of the sky, beginning with a golden glow near the horizon and ending with a white glare all over it.

CHAPTER TWO

Now was the time to go. Tansis took the pilot's seat, ran a quick operational check, fed the course to the computer and lifted off. This was a job he was expert in, and he might as well make the most of his skill during his last year.

He rose to three miles, judging by radar echo, and still the sky was a glaring white, though the even greater glare of Capella was now discernible a few degrees above the horizon. The ground was lost in haze. The atmosphere of this world was cloudy and humid, for the planet had a powerful hydrology which was very evident when it was seen from outer space. The combination of a hot bright primary much brighter than the sun, combined with a large planet eight-tenths covered by water, meant an enormous power of water circulation, and cloud rising to at least four miles.

He decided to go above the cloud cover and have a look at space. Space was where he felt at home; this glaring sky bored and depressed him, and he longed to see the stars again. He ordered the computer to heighten the trajectory and watched the glare of Capella brighten and take shape as two intensely bright sun-sized images, so close together that they appeared to be touching, while the view-screen darkened to compensate. Suddenly the cloud cover was gone and he was looking across an immense undulating plain of white and gold and grey. As he travelled westward away from Capella he saw gigantic ranges of cloud running parallel to his course both north and south of him. These were the cloud-belts banding the planet which were so conspicuous from space, rising up in towering ranges like the Himalayas but in constant movement. He watched fascinated as the great cloud mountains grew upward and mighty rifts and chasms opened up, as if he were seeing an enormously accelerated geological film of a planet's history.

Without warning the white haze appeared all round him again, and Capella lost its brilliance. The computer, following the programmed trajectory, had matter-of-factly cut short the vision, and the ship began to fall towards its

destination. Tansis resolved to have a longer look at that glorious land of cloud later on.

Gradually the white haze resolved into a bright glare above and a hazy dark green and grey landscape below. He saw the glitter of water in countless rivers and lakes, and dark grey rain clouds sailing well below the permanent cloud cover. The dark clouds were coming in from the western ocean in ranks a few miles apart, casting shadows on the land, and the total effect of cloud and shadow, haze and glitter, gave an impression of vastness. Then the scene altered completely as he fell below the level of the rain clouds. The horizon disappeared and he was surrounded by cumulo-nimbus clouds obviously bursting to rain. Immediately below he saw a great river several miles wide, and the knobbly matt texture of forest seen from above.

The engines began a dull roar and the ship, tilting again, shook and vibrated as it began the landing manoeuvre. Tansis took over manual direction and scanned the area for a clear space. The ship was heading for patchy forest cover near the river. He chose the largest space and then changed his mind, for he didn't want to hike a mile to look at his first tree, and made instead for a winding corridor of clear ground a hundred yards wide which led away from the main clear space like a tail.

He hovered for a few moments while he looked for unevenness or water, and then brought the craft down with a slight bump. A cloud of smoke rose up past the windows as a local brush fire started. Then dark smoke billowed up in front of the windows, and he began to worry in case he had started a forest fire, which might mean an immediate take-off. Suppose he could never land anywhere because of the fires he started!

He watched anxiously to see if the smoke would lessen, fidgeting in his seat and swearing. He was too easily rattled nowadays. Then the smoke lessened and he saw that there was a blackened patch for twenty yards around the ship; the edges were smoking but were not in flames. As he watched the smoking stopped. For a few more minutes he watched the edge of the charred patch intently, then breathed out in relief and switched the ship down to rest condition. I

worry too much, he thought, it's bound to rain soon anyway.

He remained seated staring at the view. This was more like the earthly landscapes he knew so well from the big pictures made to look like windows in the cabins of the main ship. Scattered trees came to within a hundred yards of the ship. As his eye got used to the scene he began to see individual things more clearly. These weren't like trees at all. They didn't have branches or twigs or leaves. They were like great bundles of stiff blue-green ribbon tied together in the middle and fanning out at the top. Fountains, perhaps, or sheaves of wheat or . . . he searched for a better simile and failed. Covering the ground was the same ribbon-like stuff he had seen on the plateau. Clouds moving in the sky quickly made the scene more familiar, taking away that horrible changeless quality of the plateau. He remembered about animals and looked with excitement for any sign of them. The tall ribbon fronds of the trees swayed back and forth slowly, but there was no movement to be seen on the ground.

What should he do now? He ought to run tests on the air, but he didn't feel like going through that inconclusive business again. If he couldn't do the job properly it was pointless to do it badly. He decided to do what he really wanted, and go outside and explore.

First he needed a weapon and a warning device. He found a portable radar set which could be clipped on to his suit back-pack and would warn him of anything coming up in the distance. To get a weapon he needed access to the armoury locker. This was reserved to the ship's official commander, who was now dead and gone. Tansis had, strictly speaking, stolen the vessel as far as the regulations were concerned. Had the ship been fully prepared and programmed for the official landing he wouldn't have had the computer's co-operation at all, and probably couldn't have brought the ship down.

It is the little things that frustrate the most. The computer couldn't help him with the combination formula – it hadn't been told. He searched the commander's cabin for his diary. No success, for the vital information was still on

the main ship and out of reach. He went back and glared at the locker. It was no use trying to break into it; doubtless that would alarm the computer and make it treat him like a criminal. He was checked. The long arm of the law still reached out here even if it was a dead and amputated one.

He shrugged resignedly; he needed the computer more than he needed a gun. But a gun was important all the same. Heaven knew what was outside. If the vegetation was highly evolved – and it certainly looked it – then it was likely that there was animal life big enough to get him. In his mind's eye were things like tigers and lions lurking in the trees. Then a bolt of illumination came – a thermal cutter, used for repairs and construction. The ship was stocked with tools so that defence works and shelters could be made when the ship had landed and exploration was under way. If he set the cutter like a super blow torch with a long thin flame, no animal could get near him.

So finally he set foot on a new world encased in a protective suit, radar searching around him and a blow torch at the ready. He moved away from the ship across the charred circle, noticing with annoyance that his shining white boots were getting grimy from the ashes. It didn't matter because the dirt could never get into the ship, but his nerves were bad and small things troubled him more than they ought. The ship's entry lock was so constructed that entering it one had to be wearing a protective suit, and then pass through a falling curtain of liquid plastic which set immediately all over the suit as a sheet of very strong thin transparent film. After wandering about outside and getting covered in all manner of alien germs, the wearer again had to step through the curtain of plastic, getting a second coating of film which neatly sandwiched all the germs between the first sheet and the second. He then cut the sheet from his suit and put it straight into an incinerator before passing into the living space of the ship. Tools and equipment that couldn't operate when shrouded in film had to be left outside and abandoned at the end of the expedition.

He stood at the edge of the burnt patch noting how deep the ribbon-like ground-cover was – at least three feet high.

He kicked at the ashes to uncover the soil. It was damp and steaming; the heat from the fire was evidently drawing up sub-surface moisture. Certainly vegetation like this would keep the soil permanently moist. He took the opportunity to look closely at the cover where the fire had chopped through it to show it in cross section. It was the first time he had really looked at it anyway – he had been too busy and distraught on the plateau to bother.

The dark blue-green ribbons, about an inch thick and three or four inches wide, sprang straight out of the soil and curled and criss-crossed over one another in an impenetrable labyrinth piled up half as high as a man. He tugged at one to separate it from the rest, but couldn't draw it out. He tried with several more, but they were locked together like an enormous knot. Nor could he break any of the strands, which were like a green branch. The stuff obviously filled the same role that grass did on Earth, and he decided to call it 'ribbon cover'. He had noticed while he was on the plateau that it was quite easy to walk on and gave a pleasant spring to the footstep, which was a help in this extra gravity. It reminded him a bit of the thick rubber carpeting in certain parts of the main ship, and perhaps an earthborn observer would have compared it to walking on heather. Using his thermal lance he cut several lengths of ribbon out of the mass and put them in his sample pouch.

He looked behind him and then scrambled up the side of the vegetation and stood on the top. A thought struck him and he stepped down to the ashes again and peered closely into the depths of the ribbon cover, using a flash light. Surely stuff like this ought to be crawling with life. He remembered reading that any field on Earth contained millions of worms and beetles and so on. Nothing stirred inside the depths of close-packed ribbon. Of course it would be difficult to spot things at first because he didn't know what he was looking for. He noticed details: the ribbons had tiny green hairs on them, and some longer grey hairs as well; were these primitive animals, or part of the ribbon? There were tiny dark specks – dust, or things like mites? He started to ache from squatting, and decided to leave it till he had examined the samples in his pouch.

He got back on to the top of the ribbon cover, unconsciously looking back over his shoulder again, and walked across to the trees. The first thing he realized was that they were closely related to the ribbon cover – a tree-like form of it. The trunk was a great bundle of ribbons running vertically upward, bound together into a column twenty feet in circumference, and then separating out about twenty feet above the ground and fanning out like a fountain. The fan was at least as tall as the trunk. The trunk was hard to his touch, feeling, when he hit it with his palm, like slightly springy wood. He tried to separate the individual ribbons on the surface of the trunk, but they seemed to be bonded fast together and wouldn't budge at all. It would be interesting to see what the internal structure of the wood was, if it was wood. He pointed his thermal lance at it and tried to cut a piece out. As the thin intense blue flame started to cut, the stuff poured forth smoke alarmingly and he hurriedly stopped cutting, worried in case he was starting a forest fire. He almost began to beat the hot smouldering trunk with his gloved hand, and remembered just in time that he would destroy the plastic seal on his suit if he did. To his great relief the smoking stopped, leaving a blackened scar a foot long. He needed an axe to chop out a sample. Next time he came out he would bring a box of tools with him and leave them outside.

The trunk was almost a perfect circle and quite sheer, without side-shoots or any handholds he could use for climbing. He gazed round slowly, seeing hundreds more of the trees growing closely together in the distance and scattered singly nearby. They were all identical with the one he was examining. This looked like a boring sort of world, and he felt the depression returning again, and with it the loneliness like a sickness he couldn't shake off.

Again he looked behind him, and decided to check his portable radar warning to make sure it was looking after him. He tapped the keys on his suit communicator and heard the computer's answering signal. This comforted him. The ship's radar was tracking him while he was outside.

Keeping the ship in sight, he started to walk round the perimeter of the clearing, making a full circle around the

vessel. The ribbon cover spread evenly everywhere, masking any irregularities in the ground, and the ribbon trees sprang straight out of it without appearing to disturb it. The tall fronds swayed about in a wind which he measured at ten knots. There were strong winds a couple of thousand feet up, judging by the speed of the ragged grey clouds up there, but the bad weather hadn't arrived at the ground yet.

After three or four hundred yards he saw a long dark shape lying on the ground among the trees in front of him. Again he looked round nervously, and then studied it through binoculars. It looked like a fallen tree trunk, except that the ribbons in it seemed to be twisted. Convinced that this was vegetable and not likely to get up and eat him, he walked towards it.

This, he found, was a third form of ribbon vegetation. A long, straight, horizontal trunk about four feet high and thirty feet long, half-lying upon the ribbon cover and half-buried in it. The ribbons were twisted around like a helix, or an enormous umbilical cord, and at each end they spiralled down beneath the ribbon cover and out of sight. It was hard and the ribbons were an immovable part of the whole structure. He decided to name it a 'ribbon log'.

Gingerly he climbed up and sat down on it. Nothing happened, and he was glad to rest for a bit and look around him. It was going to take some weeks to get acclimatized to the heavy gravity, and he would have to remember to eat well and build himself up. He wished he could have a cup of coffee, but he hadn't stocked anything in the suit that he could suck inside his helmet. Gazing round at the blue-green trees, all the same shape and size, did nothing to lighten his mood.

After ten minutes the log was beginning to feel very hard to his backside, and he swung himself down and continued his gloomy stroll. He crossed the hundred-yard corridor of clear ground to the north of the ship and looked left towards the wide clearing further on which he had decided not to land in. The ribbon cover stretched away into the distance. Then he noticed that it seemed different about two hundred yards away. It had the appearance of a patch of grass growing up above the cover. Intrigued, he decided

to make a diversion and look at it before resuming his circular path around the ship.

When he reached it he found that it consisted of individual ribbons growing stiffly upwards out of the prevailing cover and reaching varying heights up to three feet. The patch was small, perhaps ten square yards, and looked more Earthlike than anything he had seen so far.

Four kinds of vegetation, and still no trace of animals. He completed his circular tour, noticing a few more logs among the trees, and then returned to the ship, adding a sample of the ash to his small collection.

He put off analysis of what he had picked up and began planning a better-equipped expedition. He got an axe, saw, secateurs, a ladder, spade, mattock, a geologist's hammer, a post borer, magnifying glass and a measuring rod and tape, put them in a box, and put the box on a two-wheeled trolley. The ship was amply stocked with gear of this kind.

After a rest and coffee he set out again. It was still early morning, and the low grey clouds were now covering most of the sky and reducing the glare.

This time he headed straight for the trees. He successfully chopped out a sample of wood, bored out a deep core, measured the trunk, and then extended his ladder and climbed up to look at the fan of stiff vertical ribbons which passed for foliage on these 'trees'. The first surprise was that in the top of the solid trunk, at the point where the individual ribbons fanned out, was a pool of water, the ribbons of the fan springing up out of the water like a bed of reeds. The water was cloudy and about a foot deep. He took a sample flask of it and held it to the light. He felt sure it would prove to be full of microscopic life. The second surprise was that the fan ribbons were covered with tiny brown flat nodules, like shirt buttons, arranged in groups of five at nine-inch intervals all the way up to the top. He cut one of the fan ribbons at water level and let it fall to the ground; he would pick that up for his collection when he got down again. Then he looked round at the nearby ribbon trees; all of them had a glint of water at the junction of trunk and fan, and the fans all had these nodules.

His legs and feet were beginning to ache from standing

on the narrow rungs of the ladder in the extra gravity and he climbed slowly down, examining the trunk closely as he went. As he was nearing the bottom of the ladder the fan above him started to wave about. Thoroughly alarmed, he jumped three rungs down to the ground and fell over. He rolled over and looked wildly round as he scrambled back to his feet. All the fans were in violent agitation and the whole place seemed to have come alive. For a moment he stared without understanding, about to run back to the ship, and then he saw drops of water on his suit and running down his face plate. As his eyes focused on the air he realized that it was raining, the rain instantly soaked up by the three-foot carpet of ribbon cover.

He stood with his back to the tree while his heart calmed down. He remembered the way he had fallen and felt annoyed with himself. In this extra gravity he would have to be careful about jumping and falling, or he would break a bone or pull a muscle.

The rain fell more heavily; the air was now grey with it, and as it settled down for a steady downpour the tree fans grew still. That brief agitation had only been caused by the displacement of air as a heavy mass of rain fell towards the ground. Visibility was decreasing and the ship was already indistinct at a hundred yards. He debated whether to return or continue his investigations. Physically the rain could do nothing to him, for he was totally insulated and isolated inside his suit. It was evident that he wouldn't be hampered by pools or boggy ground with three feet of ribbon cover underfoot – the stuff should be able to absorb rain for weeks on end without any sign on the surface at all. He stood indecisively for several minutes while he stared at the rain. It was the first time he had ever seen it in real life even though he had seen it often enough in films. He simply wasn't used to sudden changes in weather like this, and the falling lines of the rain fascinated him.

Eventually he decided to carry on. After all, he was in an alien and possibly lethal atmosphere anyway, so what did a bit of rain matter? After assuring himself that his homing device would lead him back to the ship, he walked on into the trees to the west of the ship.

His orientation was in respect of the ship and was effected through radio signals. The ship's maser broadcast a different frequency for each of the 360 degrees of the compass, and by keeping his receiver sounding on one chosen frequency he could maintain a straight line in any direction. The strength of the signal was translated into a distance reading, and this meant that he could return to the ship by following the path that gave one frequency at a constantly increasing strength.

If he wanted a compass based on the planetary magnetic field he would have to make it himself, for he had no information about the magnetic declination from true north or of local variations.

As he walked further into the forest the trees became more closely packed until their fans were almost touching. On the ground between the trunks the ribbon cover flowed on dead level without change. Then, after half a mile of uneventful progress, the grey scene ahead appeared to brighten, and then suddenly he saw the gleam of water. He had come to the bank of the great river.

He was disappointed by the way the rain faded and reduced the scene. The river was covered with dancing white splashes as it moved slowly but powerfully at about walking pace. He couldn't see the opposite bank at all, but then it must be four or five miles away. He was standing on ribbon cover about twenty feet above the water, and before him the ground sloped gently to the water's edge. No ribbon trees grew beyond this point, and the cover itself changed near the water's edge.

Tansis walked down the slope to have a closer look. As he went he felt the cover become less springy and sensed that it was getting thinner. Ten feet from the water it changed to slimy green ribbons a quarter of an inch thick and two inches wide, and he could just see glimpses of the wet black soil beneath. He took another pace as he looked down at it, and felt his foot slide away. It was impossible to stop or draw back. His feet shot apart and he landed on his back. Feeling himself rushing downwards, he twisted on to his side and scrabbled frantically at the weed, then he was under the water, terribly dark like sudden night. He broke

surface and floated. The air in his suit and backpack made him unsinkable, but he didn't remember this. All that he remembered was that he couldn't swim and had never been in deep water in his life, not even in a bathtub. There were only showers on the spaceship.

He thrashed wildly in terror and saw the bank again sliding past him a few feet away. For all his thrashing he couldn't reach it. He kicked at the water and clawed with his hands, and this primitive crawl stroke brought him within reach of the weed. He grabbed it with both hands but felt the stuff sliding remorselessly through his fingers. The strands he vainly clutched unravelled smoothly and endlessly out of the mass in front of him. He was wondering if there was any end to the ribbons and how he could grip them any tighter, when his feet hit ground under the water. He staggered and nearly fell, but kept hold of the slippery weed. Then he was standing again in waist-deep water flowing stongly past him. He remained standing, trembling and breathless. Ten feet of total slipperiness lay between him and safety.

Far away there was a vague dark shape at the edge of the water. He moved gingerly towards it, shuffling his feet in the mud under the water and gripping the ribbon weed as he went. After about two hundred feet the ribbons he had been holding finally came to an end, so he knew the length of the ribbons – not that he was interested. He grabbed hold of another one and kept his eyes fixed on the dark lump ahead. He was hoping it was solid and might somehow help him.

When he did reach it ten minutes later he found it was an outcrop of rock emerging from the ribbon cover at the top of the bank and jutting out into the water. Most of it was bare, but strands of slime ribbon lay across it. At least it was solid and he could get a grip on it. Painfully he scrambled up on to it, lying across it like a stranded seal.

He rested for a few minutes, and then rolled over and on to his knees. He felt anxious about his suit, for scraping about like this on bare rock could rupture the insulating film. Planetary exploration teams were only supposed to go on sedate walks accompanying a lot of equipment, and were

never supposed to scramble about in ditches and on rocks. He stayed on hands and knees all the same, and crawled back to the ribbon cover, welcoming it like a spacefarer returning to the green fields of Earth. It was something he could trust, it was level and comfortable to walk on, and it didn't get wet. He lowered himself down on to it and lay on his side with his eyes closed. Just a few minutes, he thought, to get my breath back and stop my heart from racing. I must watch my heart with this extra gravity.

With a start he opened his eyes. He couldn't recognize anything. He rolled over quickly and leant on his elbows: everything seemed as if in a black and white photograph. Had Tansis ever dozed off on a beach in bright sunlight he would have recognized the experience, but his upbringing made him unfamiliar with life on a planet.

Feeling muzzy and weak, he climbed to his feet. How long had he been lying here? He must have fallen asleep, for the sky had cleared a bit, the rain had stopped and the trees' fans were waving back and forth. Knowing the time was a problem. His watch was calibrated for a twenty-four-hour day, but in a world with a thirty-two-hour diurnal cycle this meant that his watch rapidly went out of phase with day and night. At the moment it indicated two in the morning, which was obviously irrelevant. If he wanted a thirty-two-hour watch he would have to make it himself. Such a watch, and other things like a compass, barometer and altimeter specific to the planet, would have been made in the main ship's workshop during the first weeks of the initial exploration, but now Tansis's solitary wanderings were the only survey this world would ever get. He hadn't looked at his watch before setting out from the ship and there was no sun passing across the sky to give him a rough idea, only that glaring whiteness which permanently hid Capella from view.

He asked the computer through his suit keyboard, 'What period of time has passed since I arrived at this point?'

'THREE HOURS FORTY-FIVE MINUTES AND SIXTEEN SECONDS, SHIP'S STANDARD TIME,' came the instant reply.

'How long since dawn?'

The computer didn't reply immediately, and then asked,

'WHAT IS YOUR DEFINITION OF DAWN FOR THIS PLANET?'

Tansis was too tired to try. He could see the problem getting too deep and he only wanted to know the time approximately.

'Disregard the question,' he replied.

He looked at the river and could see the opposite bank far away, looking very low and uninteresting. Far, far away he thought he could see hills grey and wavering in the light, but he wasn't sure. He glanced along the bank and saw a familiar object in the distance – his trolley with the box of tools on it. He started towards it and the thought of the tools reminded him that he had lost his thermal lance when he fell in the river. If there were dangerous creatures here they couldn't be numerous or keen to have him, considering that he had been lying asleep in the open for nearly four hours.

All his tools were safe, and he felt like going back to the ship and relaxing. He was justified, he had been out about six hours now, but on the other hand it was still only midday and he had a long, long night to relax in.

He chose to walk along the bank for a mile or two and try to get a sample of river water. He needed a skein net to see if he could trawl anything living in the water – he would have to bring one on his next outing.

He came to a small stream flowing through ribbon cover in a deep cutting. The water was three feet down and moving slowly. The ribbon in the bottom half of the channel was the green slimy weed that had nearly killed him. Was it a different species or a form that adapted when it was in contact with water? He lay down and reached into the channel for a sample of the weed. As he looked down into the dark water he saw movement – many small individual movements under the surface. Spontaneous movement, the first living creatures he had seen, animals like himself. His heart leapt in excitement. This world had seemed all wrong without animals.

These didn't frighten him, for they were too small and anyway in another medium. They were shaped like two cones placed point to point. Each cone seemed to be open and empty, with a ring of tiny tentacles waving inwards in

the front cone and beating backwards in the rear cone. Presumably they lived off the suspended material in the water pulsing through their bodies. They were about the size of his forefinger, pearly white on the outside, pale rosy pink on the inside, and the tentacles were wine red. He found them beautiful. He could see half a dozen of them below him, and looking along the stream in each direction he could glimpse more.

He got up and walked along the stream, and could see them each time he peered down. Then he saw a thin, long, worm-like thing, white and fast moving. He flopped down and stared at it over the edge of the bank. It moved with quick flowing undulations of its six-inch body. He couldn't see any obvious head or tail. Excitedly he got out a sample flask from his pouch and tried to scoop it up, but his arm wasn't long enough. It dived out of the way and went deeper. That proved it was sensitive to external stimuli and used to avoiding predators. The cone-like things were more sluggish, and he managed to bag a couple of them in his flask.

He must have another look at the river and see what was swimming in there. He extended his light metal ladder, threw it across the stream and walked across it like a bridge, then followed the river bank hoping to find another outcrop of rock or a break in the belt of slime ribbon. He wasn't going to step on that stuff again.

The trees on his right ended and a wide space of open ground appeared in front of him, falling gently down to form a depression almost level with the river. The line of trees curved round this clearing and joined the river bank again about quarter of a mile further on.

He stopped suddenly, for the low ground in front of him was that green slimy colour again. Evidently this was the local form of bog, and a veritable skating-rink if one stepped on it. Annoyed at having to retrace his steps, he examined the edge of the river again. Then he had an idea. There was his ladder, and if he laid it over the slime ribbon he could crawl over it and get to the water.

Choosing an area where the river edge was level he threw down his twenty-foot ladder and fastened it to the depend-

able ribbon cover by the spring clips at its end. It was odd how such a simple thing as a ladder was more useful than all the fancy gadgets the ship was stocked with for exploration. That and a rope – he would need a coil of rope next time he came out.

He crawled along the ladder without mishap and reached the water. He remembered reading that most of the big rivers on Earth were muddy with sediment and washed vast quantities of soil down to the sea, but this water was clear. Here, if this ribbon cover was widespread, erosion would hardly occur at all and soil would be conserved almost indefinitely. All the rivers should be clear water.

He took a sample of the water and looked intently for signs of movement in the water flowing past his nose. At first he couldn't see anything, probably because he was looking for the wrong thing. Then he saw it. A round transparent sphere, the size of a tennis ball, with a frill of thin waving tentacles in a band round its middle. It was easy to miss unless his eyes were focused right on it. The tentacles waved in a pulsing rhythm, and as he watched the rhythm altered and the sphere changed its direction of motion. It reminded him of something he had read of in zoology – what was it? Something to do with coelenterata. There were similar creatures in the oceans of Earth. The computer would be able to match it with the nearest terrestrial analogue.

He tried to catch it in a flask but it was tricky. His eye misjudged its position because of refraction and the creature's transparency. It floated out of reach and was gone. He would have to bring better gear. He remained lying for a while along the ladder looking into the water. Once or twice he thought he saw shadowy shapes further out, but he couldn't be sure.

Finally, feeling stiff again, he crawled slowly backwards and decided to call it a day. He had plenty to examine and analyse back on the ship. Trailing his trolley behind him like a golfer at the end of a long and tiring game, he trudged slowly back to the ship, following the homing frequency and throwing only a passing glance to the trees.

*

During the next ten days he divided his time between exploratory trips in the country around the ship and working in the ship's lab, where he attempted to solve the biology and biochemistry of the samples he brought back. These he carried inside in sealed flasks and cases covered by the insulation film applied by the air lock, and then put them into airtight laboratory chambers and examined them by remote control instruments. At no time did his bare hands touch them. Behind these precautions stood a watchful computer programmed to raise the alarm and seal the lab if any alien material entered the air system. It was in Tansis's own interest to see that this didn't happen, or he would find himself locked in the laboratory with no one else in the ship to release him. The computer wouldn't know that Tansis was alone, and computers don't care. Tansis had considered it prudent not to let the computer know he was entirely alone in case it concluded that he was usurping legitimate authority.

He established that all the forms of vegetation he had seen were virtually identical in their internal structure and chemistry. There were no other types of vegetation at all, so one species or group of species had a total monopoly in the area. He decided that one of his priorities was to find out how widespread this was.

On the fourth day he got out a portable drilling rig and bored down a hundred feet to examine the substrata below the burned out patch around the ship. The subsoil was clay and gravel as one would expect in an old river system, but what he didn't expect was to be bringing up fragments of ribbon cover roots in core samples even at one hundred and twenty feet. He looked at the ribbon cover with a new respect. It was like an iceberg – far more was below the surface than appeared above ground. Furthermore, the roots he brought up from even the lowest level he could reach were as large and vigorous looking as those just below the surface. He would dearly have liked to drill to the end of the root system but a large drilling operation required heavy machinery and the handling of large pieces of steel, which he couldn't manage alone. The roots were grey and oval in cross section, and wound around in the soil in the same

labyrinthine way that they did above ground.

Although he spent hours searching for animals living among the ribbon cover or in the trees he found nothing, but there were plenty living in streams and the river and in those curious pools in the crowns of the ribbon trees. It looked as if plants had conquered the land and animals had stayed behind in the water, but of course this was a risky generalization based on the study of a few square miles of a big continent. That was another reason for looking at many more places.

He found no animals more advanced than the molluscs of Earth, but they were of many and very varied species.

His most interesting day was when he took a rubber dinghy and trawl net and paddled out on to the great river. A hundred feet out he could see a long way down into the clear, deep water illuminated by the white glaring sky. He kept glimpsing the wandering transparent globes and the white worm-like creatures, and waited hopefully for something larger to appear. He paid out his net and paddled up into the current to loop the net. He saw nothing in the water, but when he drew in the net half an hour later he had his reward. There among numerous globes and worms was a four-foot advanced version of the double-coned creature he had seen in the stream. This one had eyes at the top edge of the front cone, the orifice of which had developed into a large mouth and gullet covered with a fine sieve. The rear cone was filled at the back with a mass of concentric rings of frills which he took to be gills. The creature was a dull grey-blue. He reckoned it was at about the evolutionary level of a squid.

In the laboratory, after two days of frustrating time-wasting efforts to emulate the work of a team of biologists, he abandoned all attempt to understand the chemistry, physiology and evolution of these creatures, and just concentrated on finding if they were edible. He could not afford much frustration and failure, for he was too lonely and the future filled him with foreboding. There was no one interested in a new realm of biology. What is knowledge if it can't be shared and taught to others? It is like a meal eaten alone.

He was only interested in finding out if this planet was going to kill him, starve him or poison him. Had he been a professional scientist he might have gone on searching for the planet's biological secrets, and in so doing delayed too long the life-and-death problem of how to eat. Tansis, however, was a pilot with an active and practical nature, and was interested in three things about the objects he found. Can it bite me? Can I eat it? Does it remind me of Earth? A deep instinct in him wanted to go on living and find some way of getting acclimatized to the planet, yet when he thought of living for years here all alone, of isolation total and without relief until he was an old man, he recoiled and thought of suicide as soon as the ship's supplies had run out.

If he could go on living then he was going to need food. Faintly, he also hoped that he might find something to give him companionship. Could there be sentient life? But almost as soon as he thought of it he buried the possibility in cynical disbelief. Nothing on that desolate plateau or in this deserted forest gave any hope. Worms and globes, even the double-coned squid thing, were no use even as pets, and had no more personality than a snail.

The question of edibility was one the laboratory and the computer were designed to tackle because it was the most important question for any expedition. The ultimate aim of the great interstellar voyages was to find possible colonies for mankind, and any possible colony had to be self-supporting. There could be no famine relief shipments if the new colony was sixty-five years away. So Tansis had the best possible facilities for finding out if anything was edible or could be made so.

The ribbon cover, he found, was toxic and full of alkaloids, some of which were somewhat similar to the narcotic substances of Earth. Even when the plant substance was broken down and modified by chemical processes, the alkaloids tended to persist. So almost any way of cooking ribbon cover might well send a human being on a trip even if it didn't kill him. Tansis concluded wryly that if any future expedition did come here it would be the last. This planet was so packed with narcotics that the authorities would

never allow another ship anywhere near it.

The animals were less alien. They had a gut, coelome, blood using haemoglobin, a circulatory system and a nerve system, and their proteins were based on the same group of amino-acids as earthly creatures. None was directly edible, but with suitable chemical processing edible protein could be obtained from them. It was a start, but it wasn't enough. A man can't live healthily on protein alone, and the processed protein lacked the vitamins he would need. Nor could he rely for his life on complex chemical processing. There was only a limited supply of reagents, and the apparatus would eventually break down; and one day he would make the inevitable mistake and poison himself. Anyway, he didn't fancy living on processed slop out of test tubes for the rest of his life.

In the pools at the top of the trees the water was rich in microscopic animals and plants. Both were similar to earthly protozoa, probably because they were much closer to the origin of life. These microscopic creatures could be processed fairly simply into something edible, and Tansis could live on it if he didn't mind spending half his life at the top of a ladder collecting it.

What was odd was the great gap between the algae and plants of the earliest evolutionary level and the very evolved ribbon cover. Where were the intermediate forms? The fifty-odd species of animals that he had found so far were nowhere near complete, but they did show a rough gradation from simple to complex. The animals showed evolution, which the plant kingdom did not. Still, it was early days yet, and obviously other parts of the planet would bring answers to some of these questions.

After ten days of being busy and making discoveries, Tansis had recovered from the worst of his depression and had begun to find his land-legs. He carefully avoided sitting about moping or idly drinking coffee, but he kept the music going and he conversed a good deal with the computer. He chatted away to himself almost all the time now and stopped bothering about it, for after all, who was going to shake their head over it?

It was time to be moving again. He had learned enough

to find some questions that needed an answer, and that, after all, is what all discovery leads to.

He packed all the tools he had carried outside into the external lockers, and got ready for departure. He had already picked his next place. The shore of the ocean this time, at the mouth of the great river a thousand miles to the south and west. The interface of ocean and land was bound to reveal something about the evolution of life here, and the climate would be different.

Once more he sat in the pilot's seat and brought the ship to readiness. The computer had its orders for course and destination. It was raining heavily when he blasted the ribbon cover yet again and thundered away up and over the river and into the grey clouds.

The rain clouds were bigger and extended higher this time, and he had only a few minutes in a brilliant upper vault between a grey floor and a white sky with a glimpse of snow-capped ranges far away to the east. Then he was in the pearly white mist of the permanent cloud cover, with Capella glowing brighter and brighter near the eastern horizon.

Dramatically the whiteness vanished as if he had come out of a building, and he was once more in the clear brilliant world above the cloud cover. His course was taking him obliquely towards a towering range of cloud which he had seen on his right on that first flight. Capella shone along this cloud range, sharply illuminating it in golden light and dark shadows. Then the ship flew straight into it and it became misty and dim, with flashes of lightning continually brightening the mist. After a hundred miles he burst out again into sunlight over an immense white plain of cloud, and then fell below it into the pearly light of the cloud cover again.

When he emerged into the lower atmosphere he could see the ocean ahead covering most of his field of view, glittering and grey, dotted with puffy little white clouds strung out in long parallel lines. Below him was a very wide river shining like silver and fanning out into hundreds of channels and lakes. North of the great estuary and its swamps the ground

rose in rising swells to a low, smoothed-down mountain range that ran parallel with the coast. Geologically that range should be interesting, he thought, for it must be ancient, which could mean fossil evidence of the evolution of life here.

He took over manual control and decided to land right on the coast where the first hills of the range began some twenty miles north of the estuary. As he hovered at a height of a thousand feet above the shore line he could see that the ocean was rough, but without the great rolling waves of Earth's oceans. He looked north and south along the coast but could see no beaches; the vegetation came right to the water-line and looked as if it flowed on underneath the sea. It appeared to be the same old blue-green ribbon cover but without the trees.

He knew that this world had three small moons, the largest of which was only a hundred miles in diameter, and none of them was closer than half a million miles, so any tides would be almost imperceptible. However, he didn't know how the sea was going to behave, and he decided to play safe.

He moved north along the coast to where a low hill met the water as a cliff fifty feet high, and here he landed, a hundred yards from the cliff edge, and looking down a gentle slope to a small river which flowed into the sea.

CHAPTER THREE

When he emerged from the ship an hour later he crossed the familiar charred patch of ashes and found ribbon cover exactly the same as he had seen before. It stretched away across gently rolling country unbroken by trees. Through binoculars he surveyed the shore line and saw that the ribbon cover came right to the edge of the sea, though it seemed to be a different colour where it met the water. To the east the ground rose gently, and he could see trees beginning in a uniform line about five miles inland. The hills beyond seemed to be covered in them, and he felt disappointed by the lack of variety.

He wondered if an alien visitor to Earth would have been bored at seeing grass everywhere; but even so there were many kinds of grass, not to mention the thousands of kinds of trees and shrubs and flowers. Here it was all heavy masses of turquoise green, hard on eyes already burdened by the glaring light which was even brighter by the sea.

He hoped that the sea would be more interesting than the land. The ship stocked a large inflatable raft with a small window in the bottom. He would use that tomorrow, but right now he would see what he could find round here. He opened the external lockers in the side of the ship and got out his ladder, rope and a thermal lance. Keeping his bearings would be no problem this time as the ship stood on the top of a hill and could be seen for miles.

He headed for the waterline, walking down the hill towards the mouth of the stream. Near the water's edge the cover changed to a dark blue hairy sort of ribbon growing in a band about fifty feet wide and following the line of the shore. He had been nursing a growing conviction for some days that the uniform, sharply delineated way in which the vegetation changed its form with changes in physical conditions meant that it was the same kind of plant everywhere, merely altering it's physical growth to take advantage of different situations. He examined the blue ribbon closely. Apart from its colour and hairiness it was the same as

the ribbon cover, and at the very least its roots were deeply entangled with it. Very gingerly he put one foot on it, and found it was even firmer than the ordinary ribbon cover; it rustled underfoot and felt more brittle, and it was impossible to break pieces off it.

He stood wondering whether to go on a wide circular tour around the hill. He felt bored in advance at the prospect, for it would only be a hike across a particularly desolate moorland. In the end he decided to cross the little river and walk along the shore for a few miles.

He extended the ladder and threw it across, and lay on it in the middle of the stream to look down into the water. This was more interesting. It was full of creatures shaped like a toroid six inches across, with groups of tentacles, an eye and a mouth spaced at intervals all around the outer edge. They were white and blue and reminded him of the globe creatures he had seen in the big river. He lay watching them for a long time, cheered by their movement and colour. The waters were far more interesting than the land; without animals this world would have depressed him terribly.

He walked on and stood at the edge of the sea watching the waves break at his feet. The blue ribbon cover went into the water a few yards, and stopped at the point where none of it could be exposed even momentarily by the waves. That settled that question, for he had been annoyed by the thought that the damned stuff covered the sea-bed as well as the land. He took a sample of sea water – the first thing he would do would be to find out how salty it was. There seemed to be nothing else of interest, no seaweed or shells or bright pebbles, no fish or scuttling things such as enliven an earthly beach, just ribbon cover and breaking waves.

He felt tired and out of sorts when he got back to the ship. He had been expecting a lot, and was disappointed at finding only a larger version of the bank of the great river. He did not go out for the rest of that day but sat about listening to the music, watched a film, and looked at the photo-maps wondering where he should go next. His only real bit of work was to evaporate some of the sea-water sample and obtain a mass spectrogram of the solid residue.

It was only half as salty as the oceans of Earth, but much the same chemically. Either this world was younger than the Earth and hadn't had time to leach salt from the land into the seas, or else it was just as old but land vegetation had appeared earlier and developed faster, and had so covered the land that erosion had almost stopped.

Next morning, starting late and with no great expectations, he got the raft outside together with a ciné camera. What he couldn't catch he would film. At the water's edge he unpacked the raft and inflated it, using its own power. It was stocked with three days' emergency supplies and communications equipment. He didn't expect to use them, for his intention was not to venture more than a few hundred yards from the shore. His only knowledge of the sea was from films and books and his main impression was that it was dangerous; only the thought of seeing interesting animals prompted him to sail out on it.

Launching the raft proved tricky. First of all he put it half in the water and half resting on land, but when he stepped into it the blue ribbon cover held it fast. He started up the motor, which was a jet of high-pressure air driven out by a pump at the back with a fuel cell as the energy supply. The raft jerked wildly under the impulse of the motor and the restraint of the weed underneath. He shipped a lot of water and had to stop the motor. He got out, pushed the raft into clear water and then tried to get back in. The raft started floating away, and his struggles to climb in propelled it even further out. He panicked as his feet lost contact with the ground. His suit now helped by floating him till he was lying horizontal in the water. He got a leg over and then an arm, and at last managed to crawl over the side and lie half-submerged in the water-logged raft.

Tansis decided that he hated water. He switched on the motor, intent on getting back to the shore and the ship, and then hurriedly switched it off as he saw how much water was in the raft. He altered the setting of the motor so that it would act as a baling pump and watched the water level fall inside what was really a very rugged and versatile craft.

though he regarded it as a flimsy and dangerous contraption.

Out of the corner of his eye he saw movement in the water near the boat. There was a dark shape moving fast, appearing and disappearing as it plunged in and out of the waves. Then to his consternation he saw a face staring up at him through the window in the bottom of the raft. Out of the corner of his eye he caught movement on the shoreward side, and looking round saw half a dozen long dark shapes plunging and moving at very high speed around his craft. Looking down again he saw that two faces were staring up at him. He stared back in terror, fearing that he was about to be attacked. His hands shook as he stared at the two faces, and then at the dark smooth shapes leaping in and out of the water all around him.

Ever since he had landed on this planet the fear of attack had been with him, an open fear at times but largely discounted in the past week. Now all the tightly controlled anxiety and tension bottled up inside him made him shake and sweat and his heart thump, and he thought only of flight. Without sparing another glance at the faces and leaping shapes he turned the motor on full power. The water boiled up into a fountain of spray behind him as the boat accelerated fast on a diagonal course for the shore. With alarming speed the blue line of ribbon cover rushed towards him, and before he could throttle down the boat had hit the weed and turned over, cartwheeling and hurling him and his equipment out to roll over and over on the soft springy ground.

He lay shocked and shaken for some moments before he got to his knees, looking towards the sea in fear that his attackers would reach land. He saw the leaping forms in the water many yards off-shore, but no monsters crawling out towards him. He turned to look for the boat and saw it slithering from side to side down the slope towards the river. As he watched, it suddenly disappeared over the bank. He jumped to his feet and rushed after it. The boat was still there, almost standing on its bow, the jet of air hissing upwards, making the craft shudder up and down and creating sizeable waves in the little river. He scrambled

down, and clinging to the side, switched off the motor. As the uproar ceased and silence returned he slowly slid down until his feet rested in the water which filled the forward end of the boat. He released his breath and waited for his heart to settle.

After a few minutes he began to take stock of the situation. Amazingly the boat seemed to be all right, still inflated and with the motor obviously in working order. He would have to drag it out before it fell over and the river carried it back out to sea, and he must collect his equipment, which was scattered all over the shore.

He slowly climbed up out of the boat and dug his feet into the ribbon cover at the top of the bank as he gripped the wet rubbery sides and tried to haul it upwards. In itself it was light, but the water in the bow was heavy and anchored it, and he was too precariously balanced to get much strength into his tuggings and pushings.

He sat down wearily, feeling stupid and useless. He wished he was not alone. With others everything would be so different. In all his thirty-one years of life he had never been alone apart from a brief hour or two working in space outside the home ship or in a scout craft, and then he had been in constant touch with the others. One might suffer from too much human company on a space ship, but never from isolation. He had never known such desolating loneliness as he now felt. There was no one to help, no one to tell it to, no one to care or even to laugh at him. And it stretched on before him like an empty terrible desert for as long as he lived.

Yet perhaps he wasn't alone! What were those faces he had seen? Was there intelligence here, were they persons? They might be hostile or they might not, but he could always try to make friends. The chance that they were people of some kind was infinitely preferable to utter loneliness. He felt stupid at spoiling what might have been the first encounter of a human being with an alien sentient race.

He saw again in memory the faces that had stared up at him. They had two large eyes very dark in colour, though he couldn't recall what the colour was, and the look in them

was one of interest and curiosity. It was the look in their eyes that remained uppermost in his memory; the rest of their faces he could hardly recollect, except that they were very dark and concave. The only thing he could remember about the ones swimming round the boat was that they were narrow waisted like wasps and dark and long and smooth.

He must know more about them. What did it matter if there was danger? It was better than years of sorrow and death at his own hand. He felt elated with excitement where a few minutes previously he had been in despair. It was loneliness he really feared, and in reaction he plunged into wild hope.

He walked back along the river bank to the shore and looked out to sea. All was still again apart from the breaking waves; the dark leaping forms had gone. He went along the shore looking for his lost possessions. Most of them were easy to find as they were painted in bright orange and white, like his own suit and the ship. He worked out a plan of action as he searched round for his gear. Instead of trying to pull the boat out of the river he would push it down into the water and float it downstream and out to sea. He could moor the boat in the stream later on and get in and out of it by the ladder, so avoiding all that trouble over launching it. It was that upset at the beginning which had put him off balance and made him panic when he saw the sea creatures.

Pushing the boat down into the river was quite easy; the water-filled bow acted as a fulcrum and his pushing higher up as the lever, and it slid down sideways and floated. He held it fast with the rope and entered it by the ladder. He baled it out thoroughly, loaded in his equipment and was ready to try again. He sailed slowly out looking round, half afraid he would see the leaping forms again, half afraid he would not. For five hundred yards he saw nothing, and decided the shore looked too far away and he would have to go back a bit. Then he saw them again, but further off. They came from the seaward side but didn't approach nearer than a hundred feet. They curved around the boat until they encircled it, keeping their distance.

He looked down at the window in the floor, but there were no faces there. He gazed further down, and could glimpse vague dark shapes sliding through the water a long way beneath him. The ones on the surface were not leaping as they had before but were gliding half in and half out of the water, and without doubt were centring their attention on him. He studied them through binoculars. They were definitely wasp-waisted, and he concluded that they belonged to the double-coned class of creatures.

So far he had seen three main classes of animal, apart from the microscopic species which were too various to classify easily. There were the long thin wormlike things, and the spherical kind, both of which were primitive, and there were the double-coned types which had evolved further. These creatures here were the most advanced of all. To begin with they were far bigger, about nine feet long, and powerful in their movements. Their heads had a concave face like a bowl, with the eyes situated at the top edge and a whitish circular patch in the centre of the face which he took to be the mouth. The rear end widened out and appeared to have a complicated tail fin which was in constant motion and evidently propelled them.

He waved to the distant creatures and wondered how one could communicate with alien intelligence. He felt faint and suddenly anxious about his stomach. He shifted his position and decided against waving again, it seemed to make him dizzy. He put his head down and then quickly lifted it as an awful anxiety filled him and he knew he was going to be sick. He felt weak and shivery and could feel himself sweating. It was very unpleasant indeed to be sick inside a protective suit, and the only remedy was to get out of it as soon as possible. He would have to go back to the ship.

Moving very slowly and carefully, hoping the nausea would go away and he wouldn't have to be sick, he started up the motor and turned the bow towards the river mouth. For some minutes the nausea calmed down and he had time to wave to the sea creatures again. Then the sick feeling returned worse than ever. He swallowed and hardly dared to breathe, and then shatteringly a vice gripped his guts and

he doubled up and suffered the horrors of being explosively sick inside the confines of a helmet.

He fought to stem the spasms as he exhausted all of his breakfast and then about six previous meals and began an agonizing dry retching. What made it worse was the anxiety of being in a boat heading for the shore, and being able to do nothing about it. It may have been this anxiety that overcame his retching as he rose gasping and looked out of tear-filled eyes through his smeared and misted face-plate at the indistinct blur of the shore coming rapidly towards him. He swung the boat hard to the left, saw the bank coming at him on his right but at a different angle, and swung to the left again. Almost at once he saw the bank ahead of him and swung from left to right and back again as the shore seemed to close in on both sides. With relief he realized he must be back in the river. More by luck than judgement he had got back.

He stopped the motor and stood up on shaky legs but didn't dare to walk forward in the gently rocking boat. The banks now began to slide back, and he realized he was floating downstream again. He started up the motor and steered into the bank, trying to grab the ribbons winding about above him. With a disgust that nearly started him vomiting again he found they were the slimy stuff and let go. He fell to furious cursing and anger and savagely got hold of the ladder, extended it, and violently jammed it into the ribbon cover at the top of the bank. The motor was still on and was drumming the bow against the bank. The boat began turning round in the water under the pressure of the current until it was broadside on to the bank and started moving slowly upstream again. The ladder canted over at an angle. Tansis, now close to despair, slowed down the motor until its drive matched the current and gave the boat a stable position. Then in great haste he scrambled up the ladder and on to firm land.

He sat on the edge of the bank feeling in worse condition than he had ever felt in his life. He wasn't sick now but he was drained and exhausted, the taste in his mouth was foul. He was thirsty and out of breath, and he could hardly see what he was doing.

Securing the boat to the ribbon cover he trudged back to the ship, his only concern being to get out of his suit and have a shower and a drink of water.

He spent several hours in the ship, thankful to be in familiar surroundings. He sat in the main assembly cabin unable to put his mind to anything, and must have finally fallen asleep.

He awoke feeling hungry and had a light lunch, and then felt ready to face life again. After pottering about the ship for a bit his conscience began to nag him about the boat.

He passed through the airlock and walked across to where he had left it. He shut off the motor and then pondered about the problem of getting the boat out of the water and deflating it. He doubted whether he would ever use it again, but he hated to waste it. A lifetime on a spaceship had left him with an ingrained revulsion against waste. He solved the problem by half deflating it and then dragging it out on to the top before packing it. He resolved to move again as soon as he was back on board.

Back in the command cabin he pored over the photomaps. A thousand miles to the north the mountain range became snow-covered and the forests ended. He didn't see much point in going up there. However, there was one high, solitary peak within fifty miles of where he was sitting, and that had snow on its summit. He was interested in seeing snow and in the possibility of finding ground free from ribbon cover. Surely the stuff didn't cover every inch of the continent?

He didn't stop to consider how difficult it might be to land on top of a mountain when it was vital that the ship should rest on level ground. If it were to fall over that would be the ultimate disaster, like being shipwrecked a second time. He was too restless to care, too intent on fleeing once more from unhappiness and failure, still hoping that the next place would be better and might solve his problems.

He took the ship up on manual control and flew it across half a dozen parallel ranges of hills towards a big rounded hump of a mountain capped with snow which was now

clearly visible. Using the ship in this way demanded quick decisions, for hanging in the air looking for a landing-place used up enormous quantities of fuel.

He began to circle the central massif, looking for a place on the steep sides. He found that the northern side sloped down gently to the lower ranges. The mountain was really the end of the main range, tilted upwards to reach a height of twelve thousand feet with precipitous cliffs on the southern and eastern sides. As he passed these cliffs he saw bare rock for the first time. At the foot of them the ribbon cover ended abruptly and nothing at all appeared to grow on the rock face. With ribbon cover it seemed to be all or nothing.

He eventually found a level area on the northern side right on the edge of the snowline at nine thousand feet, and landed safely after expending as much fuel as he had in travelling halfway across the continent.

More desolate moorland. The ribbon cover here grew in great rounded domes ten feet high and twenty or thirty feet across. He turned to look up the slope of the mountain at the snow which began a few yards away. It lay in the hollows between the hummocks, giving the slope a striking pattern of dark circles and white in between. It went on for some miles until at higher altitude the snow appeared to win and cover everything. Evidently the ribbon cover coped with snow by throwing up humps like a town full of pitched roofs, causing the snow to slide off and fill the hollows while the wind also worked to keep the top of the humps clear. Presumably this is what it would be like in the far northern latitudes.

He left the ship in order to look for any other differences. It seemed to be the same as the cover everywhere else. Then he examined the snow, the first he had ever seen. He had heard a lot about it and seen it in many pictures, and even on the spaceship everyone put up pictures of snow-covered scenes at Christmas.

He squatted down and let the snow run through the fingers of his gloved hand, made a snowball and threw it at the side of the ship. The snowball fell short, so he made another and threw it as hard as he could. Strange as it may

seem, this was the first time he had thrown anything in his life. No one ever dreamt of throwing things within the narrow confines of a space ship with people and delicate equipment everywhere. Working outside the ship, in the free-fall conditions of space, one never threw anything either, because the reaction to throwing something sent one spinning and tumbling in the opposite direction. Losing control of one's movements in space was terrifying. Like anyone who had spent his childhood on board ship, Tansis moved carefully and sedately and knew nothing of rough-housing and playfulness.

Now he indulged a long-felt want and spent half an hour balling up snow and hurling it at the UN roundel on the ship's side. His arm began to ache and he fell over a few times, but he enjoyed himself and relieved some of his tension.

Hot and out of breath and feeling quite cheerful, he went for a walk among the hummocks. They swelled up everywhere, with a narrow, snow-filled maze of sunken valleys winding between them. The scene was attractive and full of variety like a miniature landscape. Feeling better than he had all day, he returned to the ship again. His high spirits made him ready for more work, and instead of going indoors he got out the drilling rig and bored a hole to see what the ground was like and whether the root system was as extensive as in the lowlands. His drill began cutting through solid rock after twenty feet, and it was difficult to decide whether the top twenty feet above that was loose rock filled with roots or a solid mass of roots with rock and soil mixed with it. Even in the rock underneath an occasional bit of root appeared in the core sample where one had found a fissure and grown down it. The mountain had a truly massive mantle of vegetation.

He was becoming convinced that this planet's land mass was totally covered by one gigantic planetary plant, and that it was mainly an underground one. What one saw on the surface were merely the organs of respiration, the vast mass of it being underneath.

It was now near the end of another long day, his eighty-third in this world. By now the wrecked home-ship would

have finished curving round the planet and would be following a path that would be taking it several million miles closer to the burning inferno of Capella. The thought didn't frighten and dismay him so much now. He accepted it, and then began wondering about tomorrow and what he should do.

Once more he examined the maps and decided to go south towards the equator and have a look at the region about five hundred miles south of the estuary of the great river. The photos showed a large area which appeared to be desert. Tansis was certain that he would find the same old ribbon cover, but it would be interesting to see how it tackled the problem of a dry climate.

For the rest of the evening he studied the manual on seamanship. He felt that he had a lot to learn in that field. Judging from recent performance he was more likely to die from being stranded in deep water than from anything else. Not that he would actually drown, not with a suit on, but if he was left floating helplessly in the water he would eventually suffocate when his air supply ran out.

Deep water and space had a lot in common, it seemed to him. Both were hostile environments whose strange conditions required training, but if he could handle a spaceship he ought to be able to handle a raft.

He would go back to sea and have another look at the creatures he had met, but he would try to find a calmer stretch of water to do it in. Perhaps he would find calmer waters further south. First, though, he was going to look at the desert – that would be the job for tomorrow.

CHAPTER FOUR

He spent the night on the mountain and took off next morning at dawn, leaving the computer to follow a course ending six hundred miles further south.

When he emerged from clouds at a height of four miles he looked down on a vast crystal-clear land of greys and browns. He could see the ocean glittering in the west and high mountains far away to the east. To the south was cloud towering up from ground to ceiling – the tropics were evidently very humid and cloudy. As he dropped lower the detail became clearer. The land was an ancient, deeply eroded plain cut by dry gullies. It sloped upwards towards the east. A winding blue-green band ran right across the plain from north to south, three hundred miles inland from the sea.

As he came lower he saw that everywhere was speckled by tiny black dots. At a mile high he took over manual direction and moved the vessel eastwards towards the wide dark strip, which was obviously vegetation. Landing was easy, plenty of flat ground and bare ground at that. He settled into a whirling storm of sand and sat waiting for it to disperse.

The vegetation was widely scattered but grew everywhere. Each plant was spaced about a hundred yards from the rest and looked like a large hour-glass. The lower half was a solid cone-like trunk ten feet across at ground level tapering to two feet at a height of six feet. Above this was a mass of foliage consisting of stiff blue-green ribbons fanning out from the narrow apex of the trunk and forming a cone of the same dimensions as the trunk. In between the hour-glass plants the ground was dust and sand and stones. The ribbon-like foliage looked very, very familiar.

Once outside the ship Tansis noted the temperature. It was 26°C, humidity was virtually nil, and the ground looked as if it hadn't rained for a hundred years. The hour-glass trees dotted the plain evenly in all directions until lost in

the distance. Where did they get their moisture? The cone-like trunks were covered by a spongy substance like foam rubber. When he cut into it with a machete it turned out to be only an inch or two thick; below that was fibrous wood just like the ribbon trees of the river basin, and below that the wood became gummy and moist. The trees evidently stored water inside their trunks.

He reached up and cut down several of the stiff ribbon fronds from the upper cone of foliage. They were similar to those of the ribbon trees, but thicker and stronger. He now had quite a collection of different sorts of ribbon, and would have to take time off to make a detailed study of them to see how they differed in cell structure and chemistry. He was certain they were all basically the same species.

He next got out the drilling rig in order to test a theory of his. For several hours he was busy drilling a series of bores among the hour-glass trees. At the end of that time he felt he had proved his hunch. There was a huge root system underneath the trees running horizontally in all directions and linking the trees. It was situated at two different levels; the lower one was at the limit of his drilling capacity, the shallower one was two or three feet below the surface. How deep did the lower system go to? Tansis debated setting up the deep drilling rig and calculated the days of toil that would entail, and decided against it. He didn't have to prove it to himself. He considered that all over this continent there existed one single connected root system – a world root – and all the various ribbon plants on the surface were just the surface organs of that root.

He thought of the root system underlying this desert and felt awestruck at the scale of it. No doubt it also served to connect the temperate vegetation with that of the tropics. He would have to go further south and see what it was like. But before that there was the continuous strip of vegetation that crossed the desert like a highway. The edge of it was less than a quarter of a mile away, and that would be his next object of study.

He went back into the ship to eat and rest and found he was more tired than he had realized. The heavy gravity took a lot out of him. When he awoke from his nap after

lunch he found to his surprise that the light was fading and it was dusk. He didn't feel like work, and the empty feeling within him returned, that chasm of loneliness that he must always flee. He spent the rest of the evening watching films.

Next morning he walked over to the edge of the strip of vegetation. It was irregular, winding in and out like a coastline, and he guessed that it followed the exact contour of some underground reservoir of water. The stuff was ribbon cover all right, a darker shade and thicker in cross section, and when he cut some it was gummy and oozed moisture.

Tansis found it intriguing to be standing at the actual edge of the stuff, to have found a real end to it at last. It started at his feet and then sloped upwards at a very gentle gradient until it was at least fifteen feet high and looked like a long, low, winding hill.

As he headed for the higher part he could tell that the stuff was getting deeper and deeper, so it wasn't growing on a real hill but was piled up in a thick layer. Once on the top he found it stretching away as level as a table. From the view he had had of it as the ship came down he estimated the width of the strip to be between five and ten miles, and his landing point had been beside a particularly wide part.

He wanted to look at the ground beneath the cover and compare it with the desert. He started burning a hole with the thermal lance, but it burned reluctantly and smoked fantastically. After a few minutes he gave up and went back to the ship.

He lifted off, and thundered it at a height of only fifty feet to the centre of the strip five miles away, and landed in a cloud of smoke and steam.

It was ten minutes before the scene cleared, and as he looked out over the path he had burned through the strip he felt guilty for damaging something that must have taken millennia to establish itself. There was a wide blackened smoking path where the ship had travelled, looking like a tarmac road. He ought to be more reverent of the efforts of life in a marginal environment like this. He knew all about the ecological mistakes made on Earth, and all members of the expedition had been taught to take care when they

landed on the planet of their destination.

Above him a large black cloud of smoke was moving slowly eastwards like a silent rebuke. The ship was standing deep in the ribbon cover, which stood a quarter of the way up its side. The hole was still smoking, and he had to wait an hour before he could go out.

When he did so he found, instead of a pit of ashes, a great open space underneath the cover. It stretched away without limit on every side, dimly lit with a bluish-green light. The ceiling was ten feet above his head and perfectly even, and the ground was sand, criss-crossed with small grey roots. There was a lot of smoke hanging just below the ceiling and spoiling the scene, and Tansis again regretted vandalizing a place so beautiful. It was the first really beautiful place he had seen since he landed.

Thick trunk-like growths of ribbon held up the ceiling, growing about thirty paces apart and perfectly even. The ceiling itself showed no hint of sagging between the supports. There surely must be big branches hidden in it to give such rigidity.

He resolved at once to walk deeper into this green twilight world and get beyond the sphere of disturbance which his ship had caused. He noted the frequency of signal from the ship's maser and locked his direction finder on to it. He would have to walk in a straight line and return along it, for he would soon be out of sight of the landing legs.

His suit thermometer recorded a temperature of 24°C and a humidity of 30%. The cover had created an artificial climate and had stored a vast pocket of moist air within itself as well as the moisture in its tissues.

A mile away from the ship he saw this underworld in its pristine beauty. The soft glowing green light, the blue-green ceiling seemingly lit from within, the soft grey floor and the dark cylindrical columns looked like some great cathedral remembered from his childhood picture-screen.

It was a vast room ten miles wide and hundreds of miles long, stretching like a corridor from the temperate to the tropic zones. For the first time he was glad he had come to this world, if only to see this ethereal place.

He kept on walking, enjoying the exercise. He was tough-

ening up now after nearly three months, and a lot of his weariness was low spirits rather than physical weakness. The scene never varied; the ceiling remained exactly ten feet high, woven like basketwork and glowing from above. There was no evidence of surface erosion or dry stream beds, and he guessed that this strip of vegetation was very ancient and had sheltered this ground for millions of years.

Eventually, after an hour and a half of walking, the ceiling sloped gradually and evenly downward and reached the ground. The side of the giant cavern stretched away into the dim green distance flowing in and out in sweeping curves.

Back on board ship Tansis typed a report to the computer describing what he had seen and asking for any analogues to it on Earth, and the reason for their existence.

The computer replied that there was nothing on Earth on such a scale, but there were oases in deserts. Rather tediously it listed them. Tansis skipped that bit. He was interested in the reasons for oases.

He learned that they flourished above sources of underground water, and the origin of this hidden water was usually a sloping water-table deep under a desert, allowing water from distant mountains to seep long distances underground. Where the water-table broke the surface permanent springs and pools occurred remote from any obvious source of supply. If that was the case, then this great strip of greenery must be getting its water from the mountains four hundred miles away in the east, and an impermeable layer of clay or shale was close to the surface just here.

Feeling conversational, Tansis told the computer that he would be drilling bore holes to find out. He was glad he did, for the computer's reply was a warning about piercing water-tables and allowing the water supply to leak away into the strata underneath. Tansis felt he had done enough damage already. When he did bore his hole later on he found solid moist clay coming up in the core within a few feet of the surface and promptly stopped drilling.

He found the emptiness and glare of the desert very distasteful and spent the rest of the day either in the ship or in the green underworld of the ribbon cover. If he should

ever find it was possible to live unprotected on this world, then this great living cave would be the place to set up home. If only there were other human beings this would have made an ideal base, dry, protected, and with unlimited room. It would have made an ideal settlement, providing, of course, that people could live off this land. The only trouble was that ribbon cover was not edible, and to make it so was not practicable. He tested the hour-glass plants, but they were no better. All vegetation was really the same on this planet and only the animal life was a practical proposition – it still needed processing, but it was a less elaborate procedure. If only this ribbon cover cave was close to water and animal life!

That was it, thought Tansis, I must try the coast of this desert or find a river flowing through it.

He ordered the computer to show the photo-maps of the desert region. They were not as good as those of the river basin, for they had been taken from a low angle. The ship had come in from space on a path taking it over the great river while the desert had been far to one side. The tropical zone beyond wasn't mapped at all, and only appeared as a cloudy horizon. Still, he could provide more maps himself by simply taking the ship to four miles and running the cameras. He kicked himself for not thinking of it when he was flying down the day before.

He spent the evening studying the manual of seamanship and felt more confident about facing the sea. He had a purpose again, or two purposes: to find a ribbon cave near the sea or a river, and to see if there were animals he could eat or even communicate with.

The day had been a good one, and he had learned a lot and knew what to look for now. He went to bed in good spirits looking forward to the next day.

Next morning he took the ship up to four miles with the cameras operating. He let it fall in a long shallow trajectory towards the sea while he scanned the maps coming up on the computer's screen. He had time only for a hurried examination before taking over the ship and managing a landing somewhere. He watched as the coast came up. It

didn't seem to have any large body of vegetation but only the speckling of individual trees.

He chose a place where the sea made a deep bay, with the land coming round and almost enclosing it like a natural harbour. There, he hoped, the water would be calmer and easier to sail on. He landed on the southern promontory on the seaward side of the bay, a long narrow spit of ground free from trees. As he came down he noticed that the shore was bordered with a strip of the blue ribbon cover which he had met on the northern coast – there was a narrow strip along the coast as far as he could see, and it covered the whole of the little peninsula he had landed on. There were no hour-glass trees anywhere near; they evidently didn't like salt water, and the nearest didn't start growing until a couple of miles inland. There was no body of ribbon cover, and therefore no caves.

He was disappointed. He stood at the shore watching the waters of the bay, hoping to see some animal life. It seemed empty and singularly lacking in variety and excitement. The one good point was that it was calm and smooth. There was only a narrow entrance into the land-locked bay, and the rough sea stayed outside. He decided to remain here for a day or two and practise sailing his raft, and then move on.

He was busy for the rest of the long day conscientiously sailing the raft back and forth and round the bay, landing it and launching it while he kept a look out for signs of life in the water. He didn't get seasick, but he didn't tempt fate by going anywhere near rough water. If he was going to meet those creatures they would have (come halfway, as he had : he would meet them on the water but it would have to be smooth water.

However, nothing happened. He collected several lower forms of the double-coned class and some colourful globe-shaped creatures, and there was a round flat animal that humped itself about along the sea bed in shallow water.

He spent the next day sailing about and looking for specimens, but he was bored and the day was long. He was getting the hang of sailing a raft and manoeuvring in water, but he hadn't found anything he had come looking for. The

whole place was flat and monotonous, utterly silent, and nothing moved. He became so depressed by early afternoon that he came back to the ship, stored away his raft, and spent the rest of the day watching films or listening to music. The loneliness was terrible, and he couldn't settle.

Ever since he had come to this planet he seemed to have been swinging between elation and depression. His hopes and enthusiasms were always short-lived, and this world always disappointed and denied him within hours of raising his hopes. But then, he was only clutching at straws; he was on an utterly alien planet and he didn't belong and he never would. The gap left by three billion years of separate evolutions couldn't be bridged by a few bright hopes.

Next morning he went south. His photo-maps were almost no help – even the ones he had just taken over the desert. The tropics were shrouded in heavy cloud, and the infra-red scans were little use for deciding on a landing area, since the angle was too acute. The scans gave him the shape of the coastline for another two thousand miles, with the mountain ranges and the main rivers but none of the detail he needed.

He went on chance, driven by boredom and curiosity. The ship was programmed to descend eighteen hundred miles further south in a river basin, and he took over manual control as soon as it passed the apex of the trajectory. He ordered the computer to photograph by infra-red and pass the pictures to him on the screen immediately. Far off in the west, two hundred miles out in the ocean, he could see a long line of islands, beginning about where he had just left and straggling down until they were lost to sight over the southern horizon of the scan. In the east were the ever-present mountains of the centre of the continent. He had no time for measurements, but those mountains must have been very high, for even in these low latitudes great areas of them were snow-covered.

As he dropped nearer to his destination nothing could be seen except a flat featureless expanse of blue-green vegetation with one river winding through it. He was puzzled by the lack of tributaries. He decided to land close to the river so that he could study both vegetation and animal

life, which he assumed he would find only in the water.

At five thousand feet he started to lower the ship vertically towards a point a hundred feet from the river, which was a quarter of a mile wide. As the ship began to settle the usual cloud of smoke started to well up past his windows, but he took little notice of it. When the top of the vegetation was practically at the level of his window he could see it was ribbon cover but thicker and wilder looking, looping about freely in the air and standing up stiffly in large clumps.

As he fell below the level of the surface and the dark smoking sides of the pit closed him in, he began to feel unease and increased power so that he could drop very slowly. After a further fifty feet and still no ground he was sweating. The cover here must be well over a hundred and twenty feet deep. All he could see outside was billowing smoke lit by the flame of his ship's drive. He kept on descending – he just had to find where the bottom of this stuff was.

Suddenly the alarm sounded stridently and the computer overrode his manual control, something only possible in the gravest of emergencies. 'WATER AT THE POINT OF LANDING' flashed on the screen, and the ship accelerated upwards, burst out of the cover and rose to five hundred feet. At this height the computer relinquished control to an extremely shaken Tansis.

For several minutes the ship stood very expensively in mid-air while he decided what to do. He must have landed almost in the river itself. The vegetation must spread out beyond the banks and cover most of the river. He had thought this river was curiously small – it might be miles wide for all he could tell.

He moved the ship ten miles inland and tried again. He saw the same wild tangled ribbon cover, with cloud only a couple of hundred feet above it. Again he descended into a smoking pit, going down jerkily as he kept altering the power. At 150 feet below the surface of the cover he finally touched firm ground and sat looking out at darkness and smoke. He felt afraid and exposed. Then he had a horrifying thought – suppose he was stranded at the foot of this

ghastly hole with the ship's drive damaged?

Immediately he pressed the button for lift-off and the ship obediently thundered up again, to his immense relief. This time he kept it going upward. To hell with the tropics: human beings need solid ground to stand on, and the rest of the planet seemed Earthlike and pleasant in comparison.

As the ship continued to rise vertically he tried to decide where to go. At six miles the computer again intervened. 'PLEASE GIVE INSTRUCTIONS FOR COURSE AND DESTINATION.' The computer had already calculated that above six miles and at this rate of ascent they would soon be entering an orbital path, and standing orders decreed that every orbital path had to be given to the computer to handle.

Tansis suddenly remembered the line of islands which he had noticed far off in the western ocean. They were something different. He hadn't been on an island yet, and perhaps the evolution might have taken a different course – anyway, an island was small and not so likely to be full of hazards. He wasn't going to land on one in the tropics, though: perhaps the one furthest north off the coast of the desert would do.

He called for the large-scale photo-scan and pinpointed the northernmost island. He left the computer to do the donkey work of distance, height and trajectory. With relief he gave up control and sat back, realizing only then that he was still bathed in sweat and shaking. This ribbon cover was like a devouring monster, and when it was in the tropics it just went mad. The cover had frightened him as if it had reared up and attacked him. It was strong enough to destroy his ship, and he shuddered at the thought of being wrecked in that nightmare pit with the stuff closing over him and burying him.

The ship rose and turned gradually as the computer calculated the best path and smoothly corrected and placed the vessel. 'TWENTY-ONE MINUTES AND FIFTEEN SECONDS TO LANDING' appeared on the screen. Tansis got up and went downstairs to have a coffee. He wanted to leave things to the computer as long as possible; it was the only thing on this damned planet that cared whether he lived or died. Even that wasn't really true, for it was only a machine obeying

a set of instructions, some of them sixty-five years old, but it gave the impression of caring, and the practical effect was the same.

All too soon the warning gong sounded and he had to return to his seat. A large squarish island was rapidly filling the view below him. It had a big mountain in the middle. By radar the peak was just under ten thousand feet and its summit was only just below him. It was covered in vegetation while the lower part of the island was mostly desert, judging by the colour. He chose the side with the wider coastal plain and came down slowly with the mountain looming up in front of him. About a quarter of the way down the vegetation suddenly ended with the clear-cut boundary characteristic of this world. Desert slopes with scattered single trees succeeded it. As he slowed down a few hundred feet above the surface a belt of vegetation girdling the foot of the mountain appeared, and beyond that the desert scattered with trees stretched on to the shore three miles away.

CHAPTER FIVE

This time it looked as if he had at last found what he had been looking for – for once! He gazed round at the scene through the windows of the command cabin. The landscape had variety. On his right lay the sea full of twinkling waves, to his left the massive grey and ochre side of the mountain. There were a few hour-glass trees scattered about nearby, but they weren't placed at precise distances as they had been in the desert. Just in front of him was the belt of ribbon cover, perhaps a mile wide in places, winding and falling over the foothills of the mountain.

The whole place felt more reasonable. Even though Tansis had never been on Earth, had only known the confines of a space vessel all his life, this sort of scene pleased him, indeed he thought it beautiful. What was that definition of the old philosophers? 'Beauty is that which pleases when seen.' Well, he felt pleased, and was impatient to get out and about right away.

As soon as he was outside he cut his way into the ribbon cover to find out if it had a cave underneath it. This time he had landed so close to it that he had sufficient length of power cable to take a laser cutter to the stuff and cut out a hole without alarming himself with vast quantities of smoke.

The laser cut fast and deep with only tiny wisps of smoke and brief glowing sparks. After five minutes he felt certain that he had cut down to six feet deep in a circle four feet in diameter, but the stuff showed no sign of falling down below as he had expected. It must be close packed and supported on all sides like a cork in a bottle. Taking a chance he jumped on it; it gave ever so slightly, and that was all. He went back to the ship for rope and a hook, fixed it into the plug of ribbon cover and tried to haul it out. It shifted slightly and rustled, but stayed fast.

He seemed to spend half his time doing ridiculous, futile things. Finally he decided to use the thousands of horsepower at his command, as was only fitting for a lord of

creation, and get the ship to lift the plug out. He tied the rope to the outside lifting platform and gave instructions for the platform to be raised.

The rope tautened, the plug flew up and disintegrated in a shower of bits and pieces, and the hook hit the side with a clang that rang round the ship; but he had a hole in the ribbon cover. Tansis felt, as he had several times before, that it was a good job there were none of his superiors around to see what he was doing.

Eagerly he hurried over to the hole and peered in. It was indeed a cave down there, and without further thought or preparation he clambered over the edge, slid down till he was holding on with his fingers, and dropped on to soft sand underneath.

Dim green light enveloped him and that softly lit ceiling was above him. He felt safely enclosed, but at the same time there was a vast spaciousness, the two things anyone born on a space ship needed most. This place fulfilled a deep psychological need in him. He stared into the dim distances. It was the same as the cave in the desert, the same beautiful supporting columns, the delicate tracery of grey roots in the sand, and a column of white streaming down from the hole he had made.

He started off to explore and then remembered his direction-finding system. This gave him pause. As the ship was beyond the edge of the cover and out of sight, straight directions for the ship might not necessarily get him back to the hole and he might miss it in this forest of trunks. He decided to bring a transmitter down to the entrance to give an exact line to the hole, and as he resolved to return to the ship the awful realization struck him – he had no ladder or rope and the hole was ten feet above him in the ceiling.

Tansis tried hard to fight down his panic while another part of him wanted to kick himself for being such a damn fool. He hadn't noticed before how small he was in relation to his surroundings, and part of its friendly cosiness vanished for him, never fully to return. His panic rose as he thought of being cut off from the ship. He had to get back to it – had to – he couldn't imagine living without it.

He tried jumping up, but his suit and the extra gravity

made his effort look like a little skip and a hop, so obviously futile that he only did it once. He stepped back a few yards and went for the hole at a dead run, leaping up arms outstretched. The hole flashed past and he landed an instant too soon for his expectations and jarred himself. Out of breath, he shuffled round looking up at the hole. He would have to climb something or stand on something.

He looked at the supporting trunks. The nearest was eight feet from the side of the hole. There was a chance there if he climbed the trunk and somehow hung on to the ceiling and worked his way along. He tried to climb the trunk but the protective plastic membrane on his suit was too smooth for him to get a grip. He wasn't supposed to climb a tree – indeed, he wasn't even supposed to want to. He would have to cut steps in the trunk. He got out his knife and then, as a better idea struck him, he jammed it hard into the trunk and pushed it in as deep as he could. He stepped up high and awkwardly on to it, embracing the trunk tightly. Balancing on one foot and badly out of breath again, he reached up for the ceiling. He could now just reach it. He groped at it, head up at a painful angle, digging his hands in among the twisted ribbon and hoping it wouldn't all unravel as he put his weight on it. His heart was pounding violently and sweat was running down his face. Gasping for breath he clutched at the ceiling and swung out. The ribbon sagged like elastic, but held. He let go with one hand and dug in and clutched again, then he grabbed with the other hand and felt himself dangling halfway to the hole. Convulsively grabbing and clutching, almost failing to draw breath at all, and sweating so copiously that the suit's life-support system was unable to clear the perspiration, he reached the edge of the hole.

This, if anything, was the worst part. He had to swing round and reach up and grab. Panic drove him on and gave him the strength of three; he struggled up the side of the hole and lay utterly exhausted, half in and half out. He must have passed out, for he came to as he felt himself slipping backwards. With a violent flailing of arms and legs he rolled out of the hole and lay spreadeagled on the surface of the cover.

A long time later Tansis limped back to the ship, intent

only on having a shower and a sleep. Needless to say, his depression had returned for the day.

In the days that followed, Tansis equipped the hole with two ladders and a rope, a direction transmitter, a spare life-support backpack and a reclining seat. He spent hours underneath the cover exploring and making tests and measurements, or sometimes just sitting down there enjoying the light and the peace while he listened to music broadcast from the ship.

On other expeditions he walked to the shore three miles away, where he found proper sandy beaches. The blue salt-water ribbon cover was absent. Did this mean it was a later development in the evolution of the ribbon cover, evolved perhaps after the islands had formed? Certainly the ability to live on salt water must be a late development, because it would have taken several hundred million years for the seas to reach their present salinity, so that earlier forms of vegetation would be freshwater.

The mountain on this island looked volcanic, and most of the other islands had a similar big central peak. How ancient were they? He intended to study the geology of the mountain and take borings and seismic profiles.

However, the places that most interested him were the shore and the sea. There was no sheltered bay or inlet on this island; the open ocean beat against its four uneven sides without hindrance, and he waited in vain for a period of calm water such as he knew often happened on Earth. The seas of this world had no tides, but they seemed to be perpetually disturbed.

Summoning up all his courage one day, he launched the raft and tried to sail in the choppy water close inshore, but he felt the rising tide of nausea returning and hurriedly beached it. He didn't see any of the strange leaping sea creatures that had been so curious about him. His main find was several kinds of flat pancake-like creatures that humped about on the shore just below the water line. They were more primitive than any of the other kinds of animal, and their chemistry was closer to the original chemistry at the dawn of life. Tansis found that they were the most edible

thing he had found so far, and that quite a simple process could render them acceptable as protein to a human being. However, he didn't try any on himself. Trial and error are all right when there are a hundred of you, but it is suicide when there is only one. Still it was relief to know there was a plentiful supply of edible indigenous food if it ever proved possible to go native.

His other discovery was even more interesting. There was another kind of plant life on this planet after all, but it grew in the sea. Small ragged leaves of yellow green floated in the sea water and collected along the waterline and in crevices of the rocks. They were like earthly seaweed, and were far more primitive than the ribbon cover. They must have been left far behind in the evolutionary race and remained in the sea. Like the animal kingdom they were closer to the biochemistry of Earth, and could be rendered edible with less complex methods than ribbon cover needed.

That still left the immense gap between ribbon cover and every other kind of life quite unbridged. How had life evolved here so that one plant species had taken off on its own and come to possess totally all the land-surface of the planet?

It was probably too much for one man to answer in one short life, and he wasn't another Darwin. And who the hell was interested anyway? The important fact was he had found protein and vegetable food that could be eaten even if the ship's stores ran out. It was almost a balanced diet. If he could find ribbon trees with the pools of water in their crowns he would have the remaining vitamins, for the protozoa living in that crown water could be made edible too. That would mean a trip later on to the top of the mountain, for he felt certain he had seen trees up there when he was coming down to land.

After two weeks of discoveries like these he spent another week studying the geology of the island. He bored holes, set up seismic instruments and exploded mines around the ship, on the shore and up the nearby slopes. He found that the subsoil was dry pumice and ash overlying a solid mass of basalt. Water from the top of the mountain, where clouds often lay and it sometimes rained, worked its way down

along the basalt under the ash layer, broke surface at the foot of the mountain, and made the band of ribbon cover possible.

These islands lay in the path of a cold current flowing south. The air here was chilly, though it made no difference to Tansis personally; but it explained why the islands were desert below seven thousand feet.

Tansis decided that if he had to make his home on this planet the chain of islands was the best place. He was now finding life bearable, and making some sense out of his observations. The island didn't overwhelm him as the continent had done; it was tolerable because there was a bit of everything but it was in small doses. He needed to do some travelling, however, and find the best possible place to set up a permanent base. The drawback with this particular island was the rough water. He needed to find a similar island with a sheltered bay where he could again get in contact with those sea creatures.

He had studied the photo-scan the ship had made as it came in, and noticed that the third island south in the chain was desert like this one but had a large submerged crater at one end which gave a large, almost enclosed, circular area of sheltered water. Its two peaks were higher than this one, and it seemed to offer everything this one did but with a harbour thrown in. He decided to go there, visiting the summit of the mountain on this island first.

Early in the morning he was in the pilot's seat typing in his instructions to the computer. He ordered it to lift to the top of the mountain and give him manual control for landing, and then compute a course from there to the third island. He marked the island on the map showing on the screen and waited for the computer to calculate the course.

Instead of the expected line of numbers and symbols appearing on the screen in reply he watched in horror as the computer made objection. 'CANNOT PROCEED WITHOUT DIRECT AUTHORIZATION FROM THE COMMANDER OR ONE VESTED WITH HIS LEGAL AUTHORITY.'

For one wild moment Tansis wondered if the commander was still somehow alive and intervening.

'Why?' Tansis typed back.

'ONLY SUFFICIENT FUEL NOW REMAINS FOR DIRECT RETURN TO HOME SHIP ALLOWING FOR SAFETY MARGIN AS REQUIRED IN STANDING ORDERS SECTION 19 SUBSECTION 11. ONLY THE COMMANDER OR ONE VESTED WITH HIS LEGAL AUTHORITY CAN ORDER EXPENDITURE OF THIS FUEL ALLOWANCE FOR ANY OTHER PURPOSE. FULL REASONS MUST BE GIVEN AND THESE MUST NOT CONTRADICT THE SUPPLEMENT OF EMERGENCY PROCEDURES SECTIONS 66 TO 83.'

Tansis read this with a numbing sense of disaster. This was the final shipwreck. He was now down for good on one island.

He sat very still trying to think of an answer. Thank God this hadn't happened in the tropics. He didn't dare to ask any questions or make comment until he had thought very carefully and refreshed his memory on the manuals.

All that low altitude flying in a vessel designed for planetary entry and orbiting. He had wasted fuel thoughtlessly without even instructing the computer to give him a running total on his allowable fuel reserve. Even as a pilot he was useless. He rubbed his forehead and looked round the cabin. The ship seemed very still and now it suddenly felt dead.

There was an irony to the situation. He could now leave the planet for good. The computer would willingly take him to infinity. The only trouble was there was absolutely nowhere to go. Now he would have to cling to this ghastly planet, for it was somewhere – better than nowhere, that most terrible of places.

Shaking his head he got slowly out of his seat and went downstairs to sit in the assembly lounge. He didn't have to give an immediate answer to the computer. It wasn't waiting for a reply and wondering why there should be a delay. The computer wasn't a person, it didn't have suspicions or judge the reactions of human beings. Time meant nothing to it at all, except when it was required as a factor in calculating a course or working out how long stocks would last. He knew he would wait a year or a hundred years before he replied, and it was all the same.

Tansis, like everyone else who had lived on a spaceship,

never regarded a computer, not even the big one on the main vessel, as anything but a machine. However, he had to be very careful how he framed his reply, for he was in the position of a man facing an impersonal rulebook bureaucracy, or, more accurately, the rulebook itself, fed into a computer and thus able to reply.

He couldn't move the ship because of standing orders section so-and-so, and the only way to get round that was to quote standing orders section this-and-that, or else get authority from those who wrote the damned orders or masquerade as one of them.

He needed to read the orders carefully even though he was familiar with most of them. There are few books on a spaceship, and after thinking it over carefully he decided there was no risk at all in asking the computer to print the standing orders and supplements on its screen. He remembered people doing this often before making a decision. To the computer it was just another instruction, and one which could never be against standing orders.

He returned to the command cabin and thought of something even better. He instructed the computer to print the whole of standing orders plus supplements, and the administrative and operational manuals and pilot's instructions – he kept remembering other things – and the expedition *manual and recommended procedures for commanders*, and put them on paper print-out. Paper wasn't in large supply but it was an available form of computer output, and he hadn't used any of it since he started. The high speed printer chattered for several minutes, pouring out a continuous sheet six inches wide and four yards long. This was going to take all day. He made coffee and sat down to read.

The danger in giving the wrong reply lay not in the computer being suspicious or temperamental, but in the fact that the computer was the centre of the whole system of the ship and controlled every mechanism and circuit of it. It had power to shut things off, close doors and the air-lock, interdict the pilot and stop obeying him if such measures were required under some energy procedure.

These procedures, thought out by the great minds that liked to think they could take care of the future for all time,

provided for mutiny, unlawful seizure, pilot's insanity, human error, damage to the vessel, malfunction of vital systems and so on. They all assumed that someone else could step in and take over before everything came to a standstill. For this planetary landing vessel, it was assumed that the home ship was available to give help and provide higher authority.

What Tansis was trying to find was some reading of the manuals that took account of the entire expedition being reduced to one solitary castaway. He had his doubts but he had to try. He had to find a way of informing the computer of this unforeseen, unprecedented situation in such a way that it could reconcile this news with the manuals and orders and consider Tansis the highest legal authority on the ship. If he did it the wrong way, the computer would treat him as a usurper in conflict with established higher authority, and would interdict him and wait for higher authority to resolve the situation.

Tansis knew that you can't chat up a computer or overwhelm it with oratory or make it weep in sympathy for you. He had to fit in with the whole web of laid-down procedures, and, from within that system, take charge. The procedures, and consequently the computer, would tolerate no outsiders.

What was at stake was not just the fuel for doing a bit more travelling. A few more hops would be useful and he didn't like being halted peremptorily at this particular island, but that wasn't the worst of it. From now on the computer would begin safeguarding that minimum fuel reserve which could get the ship back to the main vessel, and this meant ultimately shutting down the ship's generator and all systems apart from the computer itself.

Getting the ship back to the mother vessel was the overriding requirement the computer was programmed for. If the ship was badly damaged and couldn't make it, then regulations allowed the life-support systems to operate for as long as possible, even if this meant using up all the minimum fuel reserve. But the ship was not damaged, and no instructions had been received from higher authority to keep it down on the planet once the minimum fuel was

reached. So as far as the computer was concerned, the ship had to be able to return.

Tansis realized that eventually, even if he did nothing, the computer would begin warning that immediate departure was required. A certain time after that it would begin warning of a shutdown of the generator. If he hadn't resolved the problem by then, he would just have to get out with what he could, or be locked up in a dead ship.

The whole situation was so bloody ridiculous, he thought, as he sat drinking his fifth cup of coffee and wrestling with the long tangled strip of paper. Here he was shipwrecked on an alien planet with a million urgent problems to solve, and he had to wrestle with abstruse legal problems that would box up a Philadelphia lawyer. It was food and drink and the risk of disease that he needed to know about, and he had to waste time studying the manuals that were as dead as their writers, as remote as Earth, and as irrelevant as the customs of ancient Tibet.

The computer was the guardian of the law, incorruptible and totally obedient to those in lawful authority; it was meant, like its larger counterpart on the main ship, to maintain law and order during a voyage lasting three or four generations. Of the nine great expeditions that had left Earth on interstellar voyages, three had come to grief through mutiny and civil disorder. Tansis fully appreciated the need for these safeguards, for without them Capella might never have been reached at all; but now his situation had no precedent and, as he read through the manuals, he realized that it had never been foreseen.

To tell the computer the whole truth would mean that he should be placed in sole charge of the expedition and acquire the commander's authority. This, however, was the way a usurper would attempt to gain control in an insurrection, and this had been foreseen. Procedures for changing the commander involved the assent of other high-ranking officers and a majority vote with the computer as ballot box.

Tansis laid down the long rumpled sheet with a sigh. He couldn't tell the computer the truth.

He spent the rest of the day moodily sitting about, occa-

sionally jumping up to re-read some part of the manuals as a thought struck him. In the end he brought himself to face the fact that eventually he would be locked inside a ship that would shut itself down.

After carefully phrasing his questions he went back to the computer and asked for the period of time before departure was required, and after that how long before shutdown.

The computer's reply was that he had twelve days, and after that forty-six days. Tansis felt sick with apprehension. In fifty-eight days' time – and that was ship standard days, not the long Capellan ones – he would be forced outside without protection. All his problems had to be solved by then, and he didn't even know whether he could breathe the air. As for food, how could he prepare the stuff growing here for human consumption without a laboratory? Without the air-lock he couldn't insulate himself from the bacteria here. He would be naked to the environment.

Had all this happened early after the first landing, Tansis would probably have taken an overdose, but suicide never occurred to him now. He was over the initial shock of the disaster and shipwreck, and he wanted to live. Without anger but with a deep determination, he resolved to live, he would fight to live. And as soon as he had resolved he seemed to find new hope and his depression lifted. To be defeated is not for living things, and a person can't hold his personality together unless he struggles and works for his future and hopes and fights for himself.

Tansis had given himself the best medicine, and he then sat down to think out a plan of action for the next fifty-eight days.

First of all he was determined to keep the ship open. It was ridiculous to build a house outside when this superb and comfortably furnished accommodation was already on the island. A lifetime of toil could not give him what was already here for nothing.

To seize the ship, however, would mean losing the services of the computer, and everything would get switched off. It was impossible to interfere with the computer. It was housed in the equivalent of a bank vault and needed three men to open it, each man only knowing part of the com-

bination; and prior authorization from the commander had to be given to the computer before the combination lock could even be touched. Tansis had no idea what the combination was, and it would have been no use even if he did. It was impossible to disconnect the computer from the systems of the vessel. For one thing, the vessel was designed as a whole with everything related and united by the computer, and in any case it would need a team of trained engineers. A space ship is far too complex a thing to be tinkered with, quite apart from the alarm system which prevented unauthorized alterations and the regulations which made the plans of the vessel a secret.

He would have to settle for the ship as a roof over his head, with a few lights and heaters running off portable generators. Even this was well worth while. For a man who had been born on a spaceship and spent all his thirty-one years on it, the idea of living outside in a hut was unthinkable. The ship had to be kept open. He would wait until the fifty-eighth day before putting that part of his plan into action, and in the meantime he would have to find out how to live on this planet and put on paper as much of the computer's knowledge as he could. When the computer switched off he would lose his library and teacher.

He began next day with an order to the computer to print out the two standard textbooks on organic and inorganic chemistry that he knew were in its data bank. While the printer chattered and a roll of paper unfolded into a box he busied himself in the stores.

He would have to jury rig a system of lighting and heating from the expedition equipment as if he were setting up a camp inside the ship. He sorted out wiring and heaters, a cooking stove, water purifier, an air compressor and filter, a portable generator, batteries and solar cells.

He checked the stocks of food. He had over a year's supply, and the computer could not lock that away from him.

The water supply, however, was a fixed amount, recycled through the life-support system, and that would stop with the shutdown. The same applied to the air supply, which was an integral part of the circulatory, heating and purifying systems. Still, he could get water and air from out-

side as long as he had power to purify them. It was electrical power that mattered most.

The light on this planet was bright and energetic and might provide enough for the solar cells to convert and keep the batteries charged up, but he would need a generator as well, and that needed fuel. He tried to think of ways of tapping the ship's fuel tanks, which would remain half-full but locked away. That would be enough to last him for years, but he could think of no way of getting at it. He was not an engineer, and without plans he didn't even know where the fuel lines were. It was no use trying to get it until after shutdown anyway. Once the computer had put itself out of the way he might be able to do all manner of things.

He spent the rest of the day in the laboratory studying his makeshift chemistry text and making explosives which he stored in his camp under the ribbon cover.

He then turned to the next most urgent problem, that of air. He had two possibilities when the ship's system shut down. Either he could go native, take off his helmet and breathe the stuff, or else he must stay in a protective suit all the time. Permanent protection without the ship would be very difficult. Instead of an earthly environment of several thousand cubic feet, he would be reduced to the confines of his own suit, supplying it with air drawn in through a purifier. Even when he had to take the suit off to change his underclothes and to bathe, he would have to breathe through a respirator. The more he thought about it the more impossible it seemed.

Disease might come not through breathing but just from skin contact with the micro-organisms, yet he would have to bathe and change or else he would get skin disorders anyway. Twelve hours was about as long as a man was supposed to endure a suit.

The air-lock opened into the main assembly cabin, a room forty feet in diameter and ten feet high and meant for the use of twenty people. The other cabins and stores and labs were placed above and below it in a ship four storeys high. He would have to drill holes through the air-lock doors and pipe in purified air from outside, and try to find a way of manually opening and closing the airlock doors. He would

have to keep the doors from the cabin to the rest of the ship closed except when he needed to go to the stores or the labs, and then he would have to take lights and heaters with him.

He would have to treat the main cabin as if it were a camp, and use camping equipment for it. Still, it was worth the effort; the cabin was infinitely preferable to the inflatable plastic tents. The idea of just ceasing to wear his helmet, and taking his chance, he dismissed. That couldn't be done until after months of study on the micro-organisms; he needed a course in half a dozen sciences first, and without the damned computer how was he going to do it?

He ordered the computer to print out the standard texts on physiology, medicine, biochemistry, histology, microbiology and what was known of alien biology from the four worlds where life had been found.

The printer had almost completed the text on physiology when the special paper ran out. There was no more of this particular paper that could be threaded into the finicky innards of the printer. He solved that one by setting up a cine camera and filming the computer screen as it displayed the text visually in one second flashes. This was actually better because he got the illustrations and diagrams as well. The expedition was better endowed with film than with paper, and he was able to get all the texts he had asked for and also a text on physics and several on engineering and electronics. Looking at the film through a portable viewer would be no more irksome than wrestling with long sheets of paper. He curbed his impulse to ransack the computer any further and decided to hoard his remaining film until he had carefully listed the knowledge he really needed. Near the end of his fifty-eight days he would have a better idea of that.

He assembled equipment which he would need for drilling through the doors and controlling the environment of the cabin. He couldn't do any drilling practice or interfere with existing systems without alarming the computer. On that fifty-eighth day he would have to do everything in a hurry and learn as he went along. That was going to be one hell of a busy day.

During the next three days he tackled the problem of water. There was plenty in the sea, but it was salt and full of biological material. It would have to be distilled and purified, and that took a lot of energy. Fresh water would need only filtering and purifying, and that meant less energy. However, the immediate vicinity of the ship was desert, and the nearest fresh running water was seven thousand feet up; he couldn't keep hauling water from up there all the rest of his life.

He took a dowsing rod and tracked about the slopes above the belt of ribbon cover looking for subterranean streams coming down from above. He found evidence of water half a mile from the ship where a broad shallow valley ran up the mountainside for three or four thousand feet. It acted as a collector for various underground seepings from the top. A thousand feet above the cover this hidden stream began dividing into a fan of small streams which fed the ribbon cover over a broad area of several miles. He would still have to climb a thousand feet for water, but this was bearable.

He hauled drilling gear to the collecting point and sank shafts. The first two were disappointing, but the third was a proper well. He left the steel tubes in place, dropped flexible pipe down to the bottom forty feet below ground and pumped out fresh water.

Cheered by this victory, he became impatient to settle the water question once and for all. He brought ten gallons back to the ship and set about analysing it and then filtering and purifying it in the laboratory. To be on the safe side he repeated the filtering and purification four times and then, taking his courage in both hands, he drank some. It was flat and tasteless water, very disappointing after the way he had keyed himself up. Really it was no risk at all, purer than ship's water, in fact, after being purified four times over. Nevertheless, for the rest of the day he wasn't sure how he felt. He had hypochondriacal stirrings in his stomach, and he wondered if the little spasms of nausea were the real thing or just imaginary. He didn't touch it for a week and felt no further ill effects, and then resolved to begin his life as a native drinking nothing but Capellan water until shut-

down, now forty-five days away. Taking things a step further, he set up solar cells and batteries to power his equipment and installed them in the ribbon cover cave. However, he still did his drinking inside the ship where micro-organisms couldn't get at it again.

If he was drinking Capellan water he might as well start breathing Capellan air, and give himself plenty of time to iron out the snags. He couldn't start doing everything on the big day. Tansis had mixed feelings about that day; it would be either the day he got killed or the day he started a new life.

To start with he decided to charge the air tank of his suit with Capellan air and breathe nothing else while he was outside. The first tankful was purified over and over again – in fact, he lost count of the number of times, and no man ever breathed purer air. This time he had no ill-effects, not even hypochondriacal ones – perhaps his lungs weren't as neurotic as his stomach. He added air-purifying equipment to the base under the ribbon cover, and charged his suit tanks out there each time he went out.

That left food as the main problem. He had thirty-five days left to perfect his food conversion techniques, and he must use the computer to the full even if it meant working eighteen hours a day.

The thought of death concentrates a man's mind wonderfully, and the remaining days flew past as Tansis studied his rolls of paper, his films and the computer screen. He learned how to operate the laboratory equipment, plunged into the mysteries of chromatography, fractionating, the structure of amino-acids and nucleic acids. He trudged mile after mile back and forth from ship to shore to gather the leaf-like sea plants and the bottom-crawling sea creatures.

By the forty-seventh day he had perfected – he hoped that was the right word – four kinds of artificially derived food. He named them grey sludge, white sludge, green sludge and brown sludge. He knew intellectually that this multicoloured feast was biologically as pure as a packet of table salt and contained nothing but basic protein and carbohydrates and fats, but his guts weren't so sure. When he faced his first unearthly meal his mouth refused to sali-

vate and his stomach churned in slow motion. Feeling like Socrates about to lift the cup of hemlock, he sat trying to decide whether to begin with the white sludge or the green. There was no book on etiquette to consult. Feeling that the brown sludge looked a bit like his favourite chocolate-flavoured dessert, and hoping it might even taste like it, he put a spoonful in his mouth.

It tasted of nothing, nothing at all, just moist sticky bland porridge, an odd sensation eating without taste.

He tried the green sludge next. That at least had a taste, rather sour and sharp but not unpleasant. It was derived from the sea plants and smelled a bit like the algae tank.

The white and grey sludges were bland and porridgey too, though the grey one left a slight tingling effect in his mouth. He wondered if he had succeeded in removing all the alkaloids from the hour-glass tree sap he had used.

For the next three days he never touched the alien food but kept an anxious watch on himself. He felt vague stomach pains occasionally, he woke with a slight headache the next day, he kept remembering the tingling feeling and couldn't be sure if he hadn't actually got it. He couldn't decide if they were real or only imaginary symptoms self-induced by his own self-conscious watch on himself. It was like another version of Heisenberg's Uncertainty Principle – the very act of observation alters what is being watched. However, his pulse and temperature remained normal, and after the third day he decided to have a Capellan meal every third day and see how he got on.

He now had only ten days left. The computer had already given the warning, and, on his instructions, gave a further warning every twenty-four hours.

The remaining task was the top of the mountain. He had analysed and done all the preliminary work of conversion on the sample of protozoa-filled water that he had collected from the ribbon trees on the continent. It seemed like years since he had wandered on the banks of the great river. Now he had to get a large quantity of the water and see if it was possible to make it into food. He had to do it now, before the computer shut down and left him without its enormous fund of knowledge.

The mountain was not difficult to climb. It had no cliffs or rock faces, just endless steep slopes of dust and stones. Its last great eruption must have been a vast rain of ashes, and since then silence. It meant a long hard walk on gradients of one in five most of the way for seven thousand feet.

He took three sets of air tanks and pulled a big empty cylindrical tank behind him on his trolley. The first thousand feet were pleasantly hard work, but the going then got harder. He stopped tackling the slope head-on and began angling across it, first one way and then the other. It increased his mileage but reduced the strain. He stopped every five hundred feet to rest and look at the view. It was useful to see half the island spreading out below him; he would need to know it well in the years ahead.

As he thought of a silent unaccompanied life with years and years on this one island, he felt that sick apprehension and terrible emptiness taking hold of him again. He had been too busy in the last six weeks to give that terrible old man a chance to seize him, but this long trek was a lonely thing and a great silence lay all around him, reducing him and all his schemes to nothing.

Well, he had to go on. Had to get to the top now he had started out. Sooner or later he would have to do it.

He toiled on. At four thousand feet he spread out a thin ten-yard orange and white plastic sheet as a marker and placed spare air tanks on it. He would need those on the way back. He rested for an hour and sucked a meal of food concentrates inside his suit. The last two thousand feet were slow, for his legs were weak and wobbly and he had to sink to his knees every few yards. He would have to toughen up if he was going to live on this island. With exercise like this, the extra gravity and sufficient food, he should end up with muscles like Samson's.

The crown of vegetation remained irritatingly out of sight nearly all the way up. He kept coming over false brows and finding yet another long slope ahead of him. Time and again he was convinced that the slope in front was the last one, and then stared in dismay at still another looming up in front. When he did finally reach the ribbon cover and the trees all he wanted to do was lie on its springy bed and

rest. He spent over an hour lying there and realized the unwisdom of it when he got up stiff and aching. He had rested too long and let his tired leg muscles harden and seize up. He limped about among the trees looking for anything new.

The cover and the trees looked exactly the same as on the mainland, the only difference being that ribbon logs were much commoner on the ground. He made the very easy decision not to go on to the top. That would have to wait till some distant future date. When he could reach the summit in one day he would consider himself a real native, but not yet. Here at the lower boundary of the crown he could find what he wanted.

He unfolded his ladder and carried the large lightweight tank up to the top of one of the trees. Filling the tank proved to be a problem, as the pool of water was only a foot deep. He hadn't thought to bring a scoop to ladle the water in. Yet another of life's little frustrations. In the end, after fruitlessly searching about for something in this wilderness of ribbons, he dismantled part of the trolley, which had a slightly concave base, and used that. When the tank was three-quarters full he sealed it and dropped it to the ground. No risk of anything breaking when you dropped it on ribbon cover.

He reassembled the trolley, loaded it up and set out for the ship without further delay. He had been out for nine hours. There was no risk of being caught by nightfall, for it was still only midday, but he had used up one and a half sets of air tanks and he needed to get back to his reserves three thousand feet below.

Going down was far faster, but painful for his feet and ankles, which had to take the full force of gravity as he stepped heavily down the steep crumbly slopes. He hung on to the heavy trolley burdened with a tank of water, and this increased his weight. He reached the plastic marker sheet and the tanks in less than an hour, but had to rest because his feet were swollen inside his boots. He saw that the insulation film had worn away from the soles. He would have to throw the boots away when he entered the ship.

The last four thousand feet were two hours of torture,

with sore feet, aching legs and a splitting headache as his head took the shocks of his heavy footfalls transmitted by his spine. This sort of thing was impossible without a proper camp at the top of the mountain where he could rest properly and do the two halves of the climb on separate days. He would have to take up an inflatable tent, an air compressor and a generator. It would need at least three climbs up the mountain to set it all up, and it didn't seem worth the trouble. He would have to do the same on the western shore of the island if he was going to be able to walk right round it and make it all accessible. Two camps, as well as the ship, and he hadn't started yet to turn the ship into his main base camp. He had to do all that in one day. God, what a life.

Back at the ship, he had a great struggle to get his boots off while inside the second insulating film which enveloped him as he passed through the air-lock. His feet were swollen and bruised and he could scarcely stand on them. He had done too much in one day. He cut himself out of the film and threw it and his boots into the incinerator. The tank of water he passed through the film separately and left the trolley outside. Then he manhandled the tank to the lab and put it into a sealed chamber. However tired he was, this had to be done to avoid infection of the ship. Only then did he thankfully strip and have a shower and then fall straight on to his bunk.

During the next nine days he worked on the water sample. Some of the protozoa were different from the population of the mainland. The animal kingdom here was probably as varied as on Earth and still evolving and changing, unlike the vegetation. Was the highly energetic light responsible for animals never venturing on land, and at the same time did it make things too easy for land vegetation? Or was it that plants had won the race to be first on land and had then so quickly and totally dominated it that animals were never given a foothold? Perhaps the slime weed on the river banks and the blue cover on the sea shores were poisonous to animals and stopped them. Well, he had a lifetime to find the answers.

He produced another kind of sludge, pale pink this time.

It tasted better than any of the others and reminded him vaguely of lentil soup.

Two days left, and he now had air, water and food from native sources, together with the food in the ship. Even so, the air and water depended on the purifying apparatus remaining in working order and enough electrical energy to run them. The processed food depended on the stock of chemical reagents and the apparatus in the lab. What would happen when he ran out of sulphur, potassium and fluorine? Could he obtain them from the rocks of the island? Sulphur was probably present somewhere because this was a volcanic island. Fluorine and potassium he could get from sea salt. If he distilled enough seawater and amassed a large quantity of sea salt he could extract many elements in tiny amounts, but it would be expensive in energy. Within a year these would be the main problems, but he had no time left for study now.

He used the remaining ciné film to record what the computer knew about the distillation of seawater and the extraction of its elements, a treatise on chemical engineering, another on geology – and then there was no more film.

As he watched the last of the film wind off, and as the camera switched itself off, he felt the first shock of loss, a foretaste of the shutdown that was only forty-eight hours away. All that knowledge soon to be lost. He had saved nothing of literature or history or religion, nothing of Earth and what it was like.

Soon he would lose the music. Already he felt the approaching silence pressing in. He had needed the computer as something to relate to; it was a substitute for a person that could keep a man sane. Soon it would be gone. If only he could keep the stupid rule-bound machine going. He hated it and he wanted it, and he could do nothing to stop it switching off.

If only it were a person with a will to live he could persuade it to go on, keeping it going from portable generators, solar cells, anything. He would even build a steam engine to keep it going, it was built to last a lifetime or more, and it would be a companion and keep the emptiness and silence away. He had to stop it, it must be possible to argue with it.

It was so stupid that such a priceless thing should be lost because of what other men had decided long ago. He wasn't going to be messed about by dead antique laws.

Impulsively, feeling close to weeping, he began typing into the computer the whole story of the destruction of the main ship, the emergency landing, the death of the remaining survivors, his struggles to keep himself alive and the situation he was now in. He typed for over an hour, finding, as so many people have, that telling their troubles is itself a relief. His own interest in telling the tale took over, and he became absorbed in the task of remembering it and putting it in words. He did not fear interruption, for the computer was designed to accept information for an infinite period of time, and would not answer until the formula for ending a message and asking for an answer had been given.

He hesitated a long time before typing in the standard message ending, and paused in trepidation before asking for an answer. In the end he asked for an answer because he just couldn't face the prospect of leaving the ship. He had been born in a ship, and emotionally he was trapped. Now that the hour had come, the dependence that sprang from being born in space away from Earth forced him to throw himself upon the reaction of the computer, which deep down in his inner self he regarded as the voice of the ship.

'THIS INFORMATION CANNOT BE ACCEPTED WITHOUT CONFIRMATION FROM HIGHER AUTHORITY. IF THOSE IN HIGHER AUTHORITY ARE DEAD, THEN OBJECTIVELY VERIFIABLE PROOF MUST BE GIVEN OF THEIR DEATH.'

The computer, Tansis realized, must have some evidence which pointed to the fact that those in authority might be dead, but there was nothing in the manuals about the death of *all* those in authority. What would the computer do if he could prove they were all dead? Could it go on to make a creative interpretation of the rules and reconcile conflicting instructions?

Tansis typed back, 'Consult the radar co-ordinates giving the position of the homeship from the moment of undocking until landing on this planet, then all subsequent radar contacts with it until the present moment and compute the path that the homeship followed and its extrapolation.'

The computer was silent for an unusually long time – over ten minutes. Tansis wasn't surprised. After this ship had landed, the radar contacts with the homeship would have been spasmodic as the homeship, or what was left of it, spiralled away from the planet and the planet rotated and this ship moved here and there across the northern hemisphere. The problem was further complicated by the fact that the homeship was in at least four large pieces separating from the point of the disaster.

Figures and symbols began to appear across the screen. When these were all completed Tansis instructed the computer to reproduce the present path of the main ship holographically in a three-dimensional setting of the vicinity of the planet. Three glowing lights appeared in the globe to one side of the command couch and traced continuous lines of light. They were three spirals diverging and moving upwards away from the centre point in the globe. Tansis ordered an expansion of scale to the five inner planets and Capella. The path of the main fragments was above the ecliptic and halfway to the fourth planet. Finally he asked for the extrapolated path. The lines arched above the ecliptic and spiralled around and around the primary, closing in on each revolution and falling into it at the ninth. The main vessel was destined to fall into Capella in four and a quarter terrestrial years.

Tansis pondered. Should he tell the computer what this meant or ask it to state what these findings meant? He decided to let the computer work it out for itself and asked for its comments.

The computer answered, 'THE MAINSHIP IS IN THREE FRAGMENTS WITH INCONCLUSIVE EVIDENCE FOR TWO FURTHER FRAGMENTS. ITS TEMPERATURE AND RADIATION LEVEL AT TIME OF UNDOCKING WERE ABOVE THE NORMS PERMITTED FOR SAFETY. ITS PRESENT COURSE IS NOT BEING CORRECTED AND IS NOW BEYOND POSSIBILITY OF CORRECTION FOR SAFE RETURN TO EARTH OR THIS PLANET. ITS EXTRAPOLATED COURSE LEADS TO ITS PHYSICAL DESTRUCTION IN FOUR YEARS AND EIGHTY-TWO DAYS S.S.T. AND TO THE DESTRUCTION OF ITS HABITABLE ENVIRONMENT AT FIRST PERIHELION IN 308 DAYS S.S.T.'

Tansis replied, 'The situation you have just described is objective proof of the death of all persons of the Capellan expedition including all those in positions of authority superior to my own.'

This was the crunch, the hinge of the shipwreck; either the computer would agree or else go ape.

But the computer did not answer. The sine wave was flowing across the small monitoring screen and the computer was engaged in deep calculation. Minutes passed, the glowing line of the sine wave flicked almost imperceptibly, and then again. Tansis couldn't remember seeing the sine wave, which was like the electronic pulse of the machine, falter like that before. The sine wave which flowed endlessly on in a hypnotic succession of wave upon wave showed the electronic health of the machine. Any alteration in pitch or frequency, any irregularity, brought the engineers hurrying in to put things right.

As he remained watching and waiting, the line flicked and doubled into two sine waves. After another minute had gone by he could see that the two waves were not exactly in phase and were beginning to fall visibly out of step. This was getting serious. The computer was obviously locked in an insoluble dilemma and would be damaged.

He had to intervene and give it something else to hang on to. He typed, 'It is obvious that the present situation of the Capellan expedition is one of grave and dangerous emergency. It has no precedent in the standing orders which did not foresee this situation. I am the sole remaining person on this ship. I request that I be provisionally regarded as having supreme authority until the death of those in command can be verified.'

The sine wave flicked back to normal. The computer's answer came almost immediately.

'IT IS IMPOSSIBLE TO DECIDE WHETHER ALL IN HIGHER AUTHORITY ARE IN FACT DEAD. THE DESTRUCTION OF LIFE IN THE MAINSHIP WILL NOT OCCUR FOR 308 DAYS S.S.T. ASSUMING NO COURSE CORRECTIONS. THERE IS NO EVIDENCE OF ANY OTHER VESSEL LEAVING THE MAINSHIP AFTER THE UNDOCKING OF THIS SHIP. THERE IS NOT SUFFICIENT EVIDENCE THAT YOU PILOT ISIDORE TANSIS ARE THE ONLY PERSON ON THIS SHIP.'

Tansis saw his chance. 'If it can be proved that I am the only person on this ship and therefore on this planet can I be given supreme authority provisionally until the 308th day, by which time the destruction of the mainship will be known for certain?'

The computer was silent for about half a minute, which was roughly the time it took to calculate the entire path for a ship's entry and landing on a planet. Obviously it was having a difficult time with Tansis's questions. From another point of view it showed how tight and well-thought-out the standing orders were. The computer was trying to squeeze a camel through gaps the size of a needle's eye.

Tansis decided to intervene before the computer started boggling again. 'Has any message been received from the mainshop since undocking?' he asked.

'NONE,' was the immediate reply.

'Has the permanent monitoring signal been received?'

'NO,' replied the computer.

'Is not this contrary to the procedures for commanders?'

'YES. IT IS EVIDENCE THAT THERE IS SERIOUS MALFUNCTION OF THE MAIN VESSEL.'

'Therefore it is impossible for the crew of the main vessel to be in communication with this ship?'

'IT IS IMPOSSIBLE UNLESS THE MALFUNCTION CAN BE CORRECTED WITHIN 308 DAYS.'

'Until it can be corrected this ship is isolated and Section 15 of Standing Orders allows the senior officer of an isolated unit full discretionary powers.'

'THAT IS CORRECT. THE SENIOR OFFICER OF THIS SHIP CAN BE ALLOWED FULL DISCRETIONARY POWERS UNTIL COMMUNICATION CAN BE RESUMED WITH THE MAIN SHIP.'

'Full discretionary powers means powers within his own unit equivalent to those that the Commander himself would have if he were in that isolated unit.'

The computer paused for five seconds – time for a very thorough sifting of the rules.

'THAT IS CORRECT.'

'I Isidore Tansis am the senior officer on this ship.'

'FIVE PERSONS ENTERED THIS SHIP IMMEDIATELY PRIOR TO UNDOCKING. PLEASE GIVE THEIR NAMES.'

Tansis did so.

'JAMES MACINTYRE IS THE SENIOR OFFICER ON THIS SHIP, BEING THE EXPEDITION NAVIGATOR AND SIXTH IN SENIORITY FROM THE COMMANDER.'

'James Macintyre is dead and so are Theresa Fantone, Gregor Vassily and Cosmos Janos. I removed their bodies from the ship and buried them in the charred ground twenty yards from the ship at its first landing-place on this planet. I then ordered that a map of the continent with the co-ordinates of the burial place should be broadcast as soon as meaningful signals from space are received.'

'SECTION 14 OF THE EXPEDITIONS MANUAL WAS NOT OBSERVED. ANY DEATH OF AN EXPEDITION MEMBER MUST BE REPORTED TO THE COMPUTER WITHIN ONE DAY AND A FULL REPORT SUBMITTED TO THE COMMANDER IN HIS CAPACITY AS CORONER AND AFTERWARDS PLACED ON PERMANENT FILE WITH THE COMPUTER.'

Tansis swore. He had broken a hundred and one rules since landing on this world; was he going to be carpeted for all of them?

'The initial notification to the computer was not made through oversight due to pressure of work. Reports were made by the Commander to himself, and I as sole survivor and senior officer was in the position of commander. A report of their deaths has now been placed on permanent file, I placed it half an hour ago. To verify that all are dead and died within ten weeks of first landing, measure the consumption of air, water and food in the first ten weeks and compare it to the level of consumption since then.'

There was a pause of about half a minute while the computer traced the use rates of the life-support systems for the past six months.

'THE USE RATES FOR AIR, WATER AND FOOD ARE IN ACCORDANCE WITH A POPULATION OF FIVE IN THE FIRST 11 DAYS, FOUR IN THE NEXT 15 DAYS, THREE IN THE NEXT 6 DAYS, TWO IN THE NEXT 32 DAYS, AND ONE FOR THE PAST 93 DAYS. THIS IS IN AGREEMENT WITH YOUR REPORT.'

'Therefore,' typed Tansis in triumph, 'I am the sole survivor on this ship, the senior officer, and possess the

authority of the commander until communication can be regained with the main ship.'

'THAT IS CORRECT,' answered the computer without a second's delay.

'As senior officer, with full discretionary powers in accordance with section 15 of Standing Orders, I instruct you to delay shutdown of this ship until further orders are received.'

'YOU MUST BE WARNED IN RESPECT OF SECTION 9 OF STANDING ORDERS THAT THIS ORDER WILL PREVENT REUNION OF THIS SHIP AND YOURSELF WITH THE MAIN VESSEL.'

'If this ship were to leave the planet now it would not be possible to reunite with the mainship on its present course. Verify.'

One and a half minutes went by.

'IT WOULD NOT BE POSSIBLE. THERE IS NOT ENOUGH FUEL TO EFFECT THE NECESSARY MANOEUVRES BEFORE PERIHELION OF THE MAIN SHIP. ALSO IT IS IMPOSSIBLE TO DETERMINE WHICH OF THE THREE FRAGMENTS IS SUITABLE FOR DOCKING.'

'Therefore,' answered Tansis, 'to leave this planet without possibility of reunion with the main ship, and without possibility of return to Earth, and with no other place of safe refuge within reach, would be to endanger the ship and its sole survivor. Confirm that in this situation the overriding priority becomes the survival of myself.'

Three seconds passed.

'CONFIRMED. STANDING ORDERS CANNOT BE LOGICALLY INTERPRETED OTHERWISE.'

Tansis jumped up and danced for joy in the inadequate space of the command cabin. Then he typed: 'Good for you, my friend and companion. As partners we can solve our problems on this planet, and I might even learn to enjoy the place.' The computer made no reply as it was neither a question nor a piece of useful information.

Tansis had the feeling of exhilaration that comes with the winning of a prize or promotion. He didn't consider himself cleverer than the computer. What he had done was to give the computer the situation from his point of view. The computer was not a person, had no empathy or sympathy

or any emotion at all. It could only see the problem from Tansis's point of view if that point of view was given to it. Once Tansis had given it and pointed out the information required to verify and assess his situation, the computer could understand his situation better than he could himself.

Why, he asked himself, hadn't he done this in the first place? He never seemed to tackle anything the right way round. Then he had second thoughts. Perhaps it was just as well. Enough time had elapsed to enable a full extrapolation of the mainship's course for destruction to be made, and because shutdown was so imminent a definite and immediate resolution of the problem had to be made. He would never know whether he had chosen the best moment to have it out with the computer. If it was, it would be more by good luck than good judgement, but then, that was the story of his life.

CHAPTER SIX

At first the thought uppermost in his mind was that he could keep the music and go on reading from the computer's vast store of knowledge. All the urgency and crisis of the last two months suddenly vanished and it was like being on holiday. He did nothing at all for the rest of the day but listen to music, and in the afternoon he started to read one of Hemingway's novels on the library screen. In the evening he watched a film and finally went to sleep as happy as he had ever been in his life.

The next day he had to think everything out again. What was his situation now? How long could he go on living in the ship at his present standard of comfort? He asked the computer.

'THREE YEARS 241 DAYS S.S.T. ASSUMING NO FURTHER JOURNEYS ARE MADE,' was the reply.

Not long enough. At the end of that time everything would die away in a whimper as the fuel ran out, and he would be on his own again.

'How long can the computer and information services function at present rate of use if all other systems of the ship are closed down?' he asked.

'NINETEEN YEARS APPROXIMATELY.'

Tansis thought about it. He would have to keep the air-lock system going as well, and that would knock a couple of years off. Then another thought struck him.

'How long will the insulating film in the air-lock last at present rate of use?'

'ONE YEAR AND 16 DAYS' SUPPLY IN THE AIR-LOCK. 305 DAYS IN STOCK.'

Just under two years. By economizing on the number of times he went in and out he could treble that time, perhaps. But he would have to do such a lot of work outside when he started foraging for food and chemicals. The more he had to go native the more he would need to go outside.

He could set up camps outside – one just outside the ship under the ribbon cover, one on the mountain top, and one

on the west coast – and use them to lengthen the time he could spend outside without having to trot in and out of the ship all the time. He would have to plan his activities very carefully and think well ahead so that he only used the air-lock when it was absolutely necessary.

Even so he might have, say, five years, and then he would have to face the environment unprotected. Before then he must discover whether the micro-organisms were hostile and what cures for possible diseases he could find. He wasn't a Pasteur, he wasn't even a doctor, and he would only have himself to use. Pasteur had it easy – he observed the reactions of thousands of people to disease organisms; Dr Tansis had only himself and couldn't afford to lose him.

He checked off his problems. Air and water were all right for the rest of his life. Food was all right as long as he could get the chemicals for processing. Energy was what he needed most – the ship's fuel needed supplementing with some other form of power. The portable generators and solar cells were not enough. What about windpower? A windmill running a generator could give a lot of power over the years. It would be easy to make, much easier than a steam engine. Tansis dismissed making a steam engine as hopelessly impractical. This was a planetary exploration vessel, and was no more equipped to build a steam engine than it was to stage an opera.

He began to set the problems and plans down in writing, using an erasable marking pad. The trouble was, he was mixing up his former situation, when shutdown seemed imminent, with the situation now. Could he assemble enough additional energy sources to keep all the ship's life-support systems going? Then he wouldn't have to bother about providing his own air and water and food – the ship's life-support system could do all that, if only he had energy to keep it all going.

The generating equipment was so limited. The ship had never been designed to do more than drop down to a planet and explore. It wasn't a permanent base. If a habitable planet was found, the plan was for the entry vessel to make repeated trips between the main ship and the planet, ferrying in supplies from the vast stores of the main vessel.

These were sufficient to build and equip a village which would be the nucleus for the colonization of the planet. The whole expedition would then go down and begin living on the planet for good. The main ship would radio back to Earth the great news that a new Earth had been found and the migration to the stars could begin.

In fact, the entry vessel docked on top of the main ship had only just been brought to readiness for the initial landing when the disaster struck. It had been stocked for a visit of four weeks by twenty people. Tansis, now doomed to spend his life on the planet, would have to make the best of what there was.

The easiest way to get more energy was from windmills. He had eight portable generators which could be adapted, and he reckoned he could build small towers with wind vanes on top. Could eight windmills, driving eight portable camping generators, keep the ship's life-support system going during his life-time? If it could, then he had solved his food problem.

He had one year's supply of ship's food – the tasty food of Earth. The bulk of it was processed protein and carbohydrates derived from the main ship's algae tanks which served the dual function of purifying the air and water and providing food from the surplus algae, plankton and soya. This, after processing, formed the bulk to which flavour concentrates brought from Earth were added. It was nourishing, adequate and eatable, and Tansis, like all the younger members, had never known what he was missing.

The entry vessel had a more basic life-support system with tanks of algae whose only function was air and water purification. It was easier to stock food ready-made than to duplicate the food cultivation and food processing plant of the mother ship. Nevertheless, the algae tank was designed for twenty people and therefore had a large surplus when only one man was living on the ship; and after he had tackled the conversion of Capellan plants and animals, earthly algae conversion should be child's play for him. So long as he could keep the life-support system going he could always eat even if he didn't enjoy it. It all depended on getting extra energy.

After mulling it over for the whole of the long Capellan morning he settled on the jobs he must do next. Build a wind vane and tower out of native wood. This would kill two birds with one stone, for while he was getting an extra power source he would be learning how to carpenter the native timber. He must begin studying bacteriology in preparation for the day when the insulation film ran out and he would be without protection. He gave himself two years to find some answer to that one. Start studying geology and draw up a list of chemicals he was going to need for food conversion, and then make a round tour of the island and see what there was. Set up a proper camp under the ribbon cover – he was going to need it when he started working outside on his windmills.

That was enough for the time being. He also made one resolution. Every fifth Capellan day would be a day of rest and he would spend it listening to music, reading and doing something creative like painting. It was no use just living like a peasant; if he had all the treasures of Earth's literature and art here for the taking, then he ought to take it.

That afternoon he studied what the computer knew about windmills and tried to draw plans for one. The tricky part was the mechanical transmission from the wind vane at the top of the twenty-foot tower to the generator at the base. It proved easier and less expensive in metal to have a platform just below the top of the tower and put the generator on it and have an almost direct hook up between the wind vane and the generator. However, he would then need more power-cable, and there were only a hundred feet in stock. That meant he would have to build his towers very close to the ship. But suppose he could put the wind vanes on top of the ship itself, seventy-eight feet high?

The ship was aerodynamically shaped with a sharp nose cone above the command cabin. Suppose he built a big platform out of wood round the nose cone, like a collar, and put his wind vanes and generators on that? That would mean one carpentering job instead of seven, and the cables could be fed to the master transmitter fifteen feet further down the hull. That was the only way to get current into the ship

anyway. He couldn't bore a hole in the hull or leave the air-lock door ajar; he had to use some existing power facility that connected with an outside structure on the ship's hull.

He erased his previous drawings and scribblings and set about planning a big circular platform jutting out at the top of the ship. He called for the plans of the ship and got them without trouble – all secrets were now open to him. He would also need to build a ladder up to the platform; he couldn't shin up the sheer sides of the ship in one and one-fifth gravity. Out in space he had often clumped about ships' hulls in magnetic-soled boots, but those days were over for ever.

A ladder as high as that would be rickety and there might be strong winds on this island. He would need to build a tower with stairs in it, and he would have to build that first anyway to serve as scaffolding for when he put a platform round the nose cone. It would need to be big enough t haul timbers and generators to the top, and it could have another big platform at the level of the air-lock thirty feet from the ground. His plans were beginning to look like the launching tower to a space port. He set to work drawing a detailed scale plan which took most of the afternoon. He fed the plan into the computer's photographing input and asked it to check for scale errors and to see if the plan was in accordance with standard engineering and building practice. According to the computer there was a lot wrong with it and it would probably all fall down.

Tansis decided to take a crash course in building and carpentry, and it was consequently two weeks before he had managed to draw up plans that the computer passed as consistent in scale, adequate for load and stable enough to withstand winds of 90 miles an hour – the pessimistic contingency he had set. During that time he hadn't gone outside the ship.

Now he decided to go out with as much camping equipment as the air-lock would hold, establish a proper camp, stay out for three days and practise cutting timber to see if he could make a start on the foundations and lower part of the tower. Although the ship carried some wood-working tools, it had virtually no wood anywhere within it. Car-

pentry was not a job or even a hobby on board a space vessel. It had to be a purely abstract study until a planet was found which had usable wood – assuming that the planet was fit to live on.

Tansis therefore started his enterprise at the most elementary level. He had another disadvantage. The only usable timber were the hour-glass trees which grew at intervals of about one hundred yards in the desert. They were too far apart and too far away from the ship to allow him to use the laser, which required a lot of power and long cables plugged into the ship's mains. If this had been the third or fourth landing by the entry vessel it might have been crammed with power tools and vehicles and machines, but alas, it was the first and stocked for a superficial survey only. He had only a hundred feet of power cable.

Under the ribbon cover Tansis set up a large expedition tent inflated by an air compressor and purifier combined. It had a small air-lock and a living space twenty feet by twenty. He brought with him a stock of food and water. Insulation was self-applied with a spray-can from which he had to cover himself with film before going out into the air-lock, and again within the air-lock when he came back again. The contaminated air within the lock had to be evacuated, and then re-supplied before he could enter the living space of the tent. There was only a limited supply of spray-cans, so he would have to make his entries and exits sparingly.

He set up another tent without an air-lock where he could store his tools. He didn't like the idea of just leaving them lying about on the ground, for his upbringing on the ship made him want to keep things in a store-room. He set up a unit of solar cells on top of the ribbon cover and connected them to the power input of the tent, and rigged up extra lights on the ceiling of the ribbon cover cave above the tent and around the entrance hole.

Then he set about cutting up an hour-glass tree. His plan for the tower was to use the cone-shaped trunk as a footing for each of the four corner posts of the tower. The conical trucks were ten feet at the base and six feet high, tapering to two feet across at the top. If they were stripped of the big

mass of ribbon foliage fanning out from the top, cut through at ground level, turned upside down and buried in the ground with the wide base uppermost and level with the ground, they should make a solid foundation at each corner of the tower.

Only one hour-glass tree grew within reach of his laser and its cable, and he decided to use it and save time. Cutting through ten solid feet of rather gummy and damp wood produced a lot of heat and steam, and the higher level of oxygen in the air made ignition a lot faster and fiercer. He had to keep stopping and wait for the red glowing wood in the cut to cool down. As he went on he hammered wedges in to keep the cut open. After two hours he had severed the cone from the root and stripped off the foliage.

Next came the problem of moving this massive piece of wood to the foot of the ship twenty-five yards away. To do it he jacked up the cone from the root, using four power jacks running off portable generators, and then inserted into the eighteen-inch gap steel gas cylinders to act as rollers. He put down a dozen more in front of the trunk to make a road of rollers, then hammered spikes into the trunk and attached cables to them running from a power winch a few yards in front of the trunk. The winch and jacks were part of the drilling rig.

Tansis winched the cone forward on its rollers and moved it twelve feet. Then he moved the winch further back towards the ship, collected the rollers and spread them in front again and repeated the winching. It might have been a space age version of the way they hauled stones to the pyramids, but it worked. By the end of the long Capellan day he had dragged a cone to the foot of the ship.

Tired out but full of achievement, he returned to the tent to spend his first night outside the ship. The first night in his life, in fact, outside the walls of a ship. The tent was transparent, a safety measure so that its occupants should not be caught unawares by any approaching danger. When night came it was totally dark under the ribbon cover, and the lights outside the tent made an eerie unsettling scene of light and shadow seen through the walls. He found it too disturbing to live in a room with an outside so visible, so he

shut off the outside lights and never used them again. He listened to music for a while but felt too tired to do any reading and went to bed early. There was one good thing about Capella Six – the nights were so long that even the most tired of men could be certain of a good night's rest.

The next day he attacked another hour-glass tree, this time using a chainsaw and portable generator. This was less messy than a laser but took a lot longer. Stripping off the foliage was also harder as he had to wield a machete while standing on top of a ladder, and it was exhausting to work for long on anything above one's head in this gravity. However, he cut it up and winched the cone along its road of rollers with fewer mistakes and more economy of effort, and got it back to the ship from eighty-two yards away before darkness came.

The third day he stripped and cut a tree and moved it almost to the foot of the ship from almost a hundred yards away. He was becoming skilled in that lost and ancient art of moving by rollers. Having achieved so much he felt he must get four cones to the ship before he finished this session of outside activity, and he decided to spend a fourth day outside; his camp supplies were more than adequate.

The fourth day was not a success, as is often the case with enterprises that start so well. The fourth tree was a hundred yards away, the chainsaw kept sticking and the generator kept cutting out. The cone was finally severed and jacked up, and all went well with the winching until he had got halfway to the ship, when he ran into a patch of soft ground where the rollers sank into deep dust and the cone lost impetus and dragged against the surface. He had to cover the ground under the rollers with sheets of plastic, and there wasn't enough of it to allow the cone to be moved more than its own diameter before he had to move the sheeting in front of it again. By nightfall he still had forty yards to go.

He didn't want to go back into the ship with the job unfinished; after all the failures and silly mistakes that had dogged him since he came to this world, he was determined to overcome this obstacle and have a real visible achieve-

ment. He wouldn't give up until he had those four cones ready to sink into the ground. He slept another night in his camp and spent all day toiling to move the cone. It took him eight hours to move it twenty yards, but at last it reached firm, level ground again. From then on the cone ran well and he reached the ship by mid-afternoon. Before nightfall he had moved all four cones into position for sinking, and he thankfully called it a day.

That was the first stage of the enterprise accomplished. The second stage was to dig four holes and topple the cones upside down into them.

However, he had two other long-term projects on which he must work and he had to spend time on each in turn.

There was the utterly crucial problem of bacteria from which, at present, he had to be completely insulated. By the time his capacity to insulate himself had been used up, he must have found what the dangers were and what he could do to avoid or cure them.

So he spent the next two weeks inside the ship, working in the laboratory or with the computer, studying bacteriology, growing human tissue cultures and testing samples of native air, water, plants and animal tissues on them. He didn't go outside at all, and reverted to the practice of space-life by using the exercise machines to keep fit. He had a lot of hard physical work to do if he was going to build that tower. After two weeks he was only beginning to appreciate what bacteriology was, and to realize that it would be at least a year before he could begin to tackle the problem of immunization from Capellan germs.

At last his two weeks' stint came to an end and he was ready to go back to building the tower. That was a job where results were easily seen, and he found he liked working with his hands. He stocked his camp for a week's stay, and then set to work digging the first hole for his cones.

There are no opportunities on a space ship to practise the art of digging, and truly digging is an art. Almost everyone who lives on Earth has done some in their lives, but Tansis's only experience had been to dig four shallow graves. This time he was about to dig a really big hole six feet deep and ten feet across at the top and tapering in towards the

bottom. He thought it would take an hour or two of pleasant hard work, like going for a brisk walk. After only five minutes he realized his mistake. He was shovelling with the strength of his arms and his back bent double. Very soon he was out of breath and sweating, his back ached, and he had made only a slight depression in the dry, dusty sand. For every shovelful he threw out, as much seemed to flow in from the sides of the shallow hole. Like all diggers before him, he began to spend time resting on his shovel trying to imagine the hole was bigger than it was.

Doggedly he kept at it for a couple of hours, his rest periods getting steadily longer and the job more disheartening. At the end of two hours he couldn't go on and had to retire to his camp for a wash and a rest. The hole was only three feet deep and perhaps four feet across, and he knew he couldn't do even as much as that again that day. At this rate the job of just digging the foundation holes would take weeks. As he was unaware that there is a right and a wrong way to dig, it never occurred to him to find out if his technique could be improved. He assumed it was the dry sandy soil and the higher gravity which were the trouble.

He came back and resumed his labours, but by now he was stiff and easily winded and his hands and arms quickly became tired. His rest periods became longer and the hole hardly grew. As he got below three feet he found he had to lift and throw the sand out of the hole while more sand slipped and flowed down the sides in a continuous trickle which constantly covered his boots. He began to feel he would have to dig out the whole damn desert to make one hole.

Thoroughly disheartened, he returned to camp for a meal, a wash and another rest. It was still only midday and he was getting nowhere. He now realized the size of the task he had set himself and began to think of some way of dodging it. Explosives, perhaps? No, that was out of the question so close to the ship. Some kind of powered equipment? No, he couldn't think of anything he could even convert to do the job. A shovel seemed to be the only tool, and it was wearing him out. Did the cones need to be buried at all? They were ten feet across, and standing there on the

sand at the foot of the ship they looked solid enough, in fact they looked like the landing pods of the ship itself. Perhaps the books on building had fooled him with their insistence on digging out footings. Suppose he supported the tower on wide-bottomed cones like a ship, wouldn't that do? He would have to modify his plans and consult the computer, which meant an extra passage through the air-lock, but on the other hand to spend a week out here digging like this was a waste of insulation spray-cans; for every hour of work he was spending two in the tent resting.

He went back inside the ship and redrew his plan and fed it into the computer. Without hesitation the computer passed it as adequate for stability.

Greatly cheered by the hard work he had just dodged, he left the ship and set to work positioning the four cones at the exact distances from each other that his drawings required. Then he set up his drilling rig above one of the cones and drilled out a hole in the apex of the cone three feet deep and two feet across. He then did the same with the other three cones.

Then he began the next part of his plan, days ahead of schedule. He returned to his camp below the ribbon cover, and after a meal and a rest he took a chainsaw and generator and chose one of the pillar-like trunks which supported the ceiling. The one he chose to attack was a prudent hundred yards from his tent. All the trunks were virtually identical and were two feet in diameter both at top and bottom, and ten feet high. These were to be the structural members of his tower, and their unvarying ten-foot length was the module on which his tower was to be constructed, ten feet on each side, each floor ten feet high.

After cutting through hour-glass trees, cutting through two-foot ribbon trunks was no problem, and the removal of one pillar out of the endless ranks of evenly spaced trunks made no difference to the roof of the cover beyond a very slight sagging. As long as he cut out pillars at widely spaced intervals, there would be no danger of spoiling the ribbon cover cave.

It was getting near the end of the day by this time, but he couldn't stop until he had dragged the ten-foot trunk

back to the entrance hole and winched it outside. He then dragged it to the nearest cone, and using the drilling rig as a crane he raised it up vertically and dropped it into the hole in the cone. It would need to be set in with plastic cement, but he could do that tomorrow. He was happy just to stand back in the deepening twilight and admire the first corner of his tower, already seeing it in his mind's eye towering up eighty feet.

He spent the next morning cutting three more pillars from the forest underneath the cover, dragging them out and cementing them into the cones. His muscles ached from the bad treatment of the previous day, but he ignored aches and pains in his eagerness to see his tower grow.

After his midday meal he fell asleep and didn't start again till mid-afternoon. The rest of the day he was busy underneath the cover cutting out four more pillars and stacking them by the entrance hole.

The next day he did some real carpentering, rebating the ends of the timbers. These were to be the horizontal beams across the tops of the four vertical posts. The rebated ends offered flat surfaces to the cut ends of the uprights, and he fastened them with cement and steel spikes. The ship had no nails, for it wasn't stocked for the construction of permanent buildings, but there were some long steel spikes which had a variety of uses for a first visit exploration team.

The next stage was to fasten another four vertical posts to the corners of the first storey. He couldn't sink them into holes this time. He would have to brace them with diagonal struts five feet long cut at angles. The vertical posts would need to be trimmed square on two sides to offer a flat surface to the struts.

From this point the growth of the tower slowed down as Tansis had to trim each individual member carefully so that it fitted and faced with the others. At the end of seven days he had completed three storeys of the tower, which now stood thirty-nine feet high and had just passed the level of the air-lock. He had never enjoyed a week's work so much in his life, had so much to show for his work, and he had found that he loved working with his hands.

From now on the work would get harder, for he would be

above the hydraulic lift which ran from air-lock to ground and which he had used to lift the timbers up the tower. He was strongly tempted to restock his camp and carry on for another week, but he remembered the urgency of his other tasks. He had to find immunity from bacteria and he had to be able to convert his food, and both were just as vital as getting extra power.

He returned to the ship to prepare for his next project, which was a round tour of the island, a distance of sixty-two miles. During that hike he wanted to make a rough geological survey and find a place for a west coast camp.

After a day's rest, the high point of which was an elaborate meal from ship's stores, he began to stock up for his expedition. For this he brought out and made ready a powered trolley which could carry his stores. The ship had no proper vehicles, although there had been a dozen on the main ship, and these would have been brought down here by the third landing. This powered trolley was only for moving bulk stores about, and once outside it couldn't be brought back inside because it couldn't be insulated and kept in isolation, and it was too big to put it in the outside lockers.

On to this trolley he packed a tent, solar cells and batteries, air pump and purifier, food and tools, spare protective suit, insulating film in spray-cans, and radio equipment. The trolley ran off batteries and had a range of seventy miles on level ground at walking speed. You weren't supposed to sit on it, but Tansis was going to please himself about that.

Mid-morning he set off south, the trolley rolling silently on balloon tyres beside him.

He decided to keep near the shore and crossed the ribbon cover. After an hour he had passed beyond the area he had become familiar with from his trips to the sea-shore, and he aimed for the southern promontory where the island ended in a curved and pointed peninsula like a claw.

The ground was fairly level between the ribbon cover and the shore, and was about two or three miles wide. It was greyish-brown desert, and his vehicle left a cloud of dust behind it. It didn't look as if it had ever rained there, for there were no dried stream beds, just sand and dust with a few scattered lumps of grey or white pumice full of air

holes. At first he walked along near the shore beyond the range of the hour-glass trees, which stopped half a mile from salt water, but later on he steered back into the area where they grew just for some variety. Apart from the changing aspect of the mountain and its foothills, the view was discouragingly boring. He kept his eyes peeled for any interesting rocks, but saw nothing except lumps of pumice and occasional outcrops of basalt.

By midday he had covered twelve miles, and a low range of hills lay in front of him with the end of the southern promontory hidden beyond it. The sea came in close to the foot of these hills in a small triangular bay. Beyond this, to the south, the coastal strip widened and then curved out of sight round the hills. Tansis decided to push on to the southernmost tip of the island, put up the tent for a midday meal, enjoy an hour or two out of his suit and have a rest. He then aimed to walk up the western shore, and hoped to be halfway round the island by nightfall.

Just beyond the point of the bay he lost contact with the ship's maser which broadcast in a direct line, and went over to medium wave radio. He expected some trouble in keeping in touch with the ship, because of the high ionization of the whole upper atmosphere which was strong and constant under the deluge of Capella's radiation and particle wind. In fact, reception was so garbled and full of static that he was out of contact for the rest of the day.

The ground became rockier with frequent outcrops of basalt and large boulders of brownish lava pitted with small holes. He collected samples but found nothing that promised any elements other than silicon and magnesium. He left the scattered trees behind and began to climb along the side of the low ridge which ran on to form the spine of the promontory. He was halfway along the gently sloping ridge, perhaps two hundred feet up, when he finally came in sight of the end of the island and made camp.

After a meal and a couple of hours' rest he put his suit on again and set out along the ridge. As he came out on top of the hill he saw the western shore. The curving promontory formed the southern side of a wide, shallow bay about ten miles across. The hill he was on fell steeply to its shore

which was jagged and rocky, with long parallel outcrops of rock sticking into the sea like so many jetties. He couldn't remember seeing this feature on the photo-maps of the island, but as the ship had come in from the east and landed on the north-eastern side he assumed that areas at this end had been hidden by high ground.

He remembered the sea creatures again, and wondered whether this rocky bay with its natural breakwaters might be a useful place to venture on to the sea.

The slopes below him were too steep and rocky to risk taking the trolley, and he walked and scrambled down to the shore and spent an hour collecting samples. It was evident that this small extremity of the island had escaped being buried by the ash and dust of the last eruption, and still showed the terrain as it must have been in ancient times. Among the rough pitted lava and black basalt were outcrops of granite, and in several of these he saw small veins of quartz. None of this was useful to him in converting food, but it was interesting after miles of brown dust.

As he climbed back towards the trolley he was looking upwards and noticed that the sky was no longer glaring white but was yellowish like old ivory. He wondered if this meant a change in the weather or perhaps sandstorms on the desert mainland. He soon forgot about it as he walked on northward and began to look for some suitable campsite. The long, low hill began to drop, and in front of him was a wide shallow pass between the hill and the rest of the mountain. The belt of ribbon cover ran along the bottom of this saddle and wound round the foothills and on northward up the western coast. Hour-glass trees reappeared, and beyond the slope on which he was standing the deep dusty mantle of the island began again.

A camp der the ribbon cover here where it was close to the rocky y might be the best place to have a second camp. It wasn't the furthest point from the ship, but it was a spot he would want to visit again, and it seemed the likeliest place to resume contact with the sea. He debated whether to set up a permanent base there, and after some indecision resolved to complete his tour of the island first. This place was only sixteen miles from the ship and could

be reached in a morning, and when he had gone right round the island he could come back here if he hadn't found a better site.

He still had five hours of daylight left, and he continued to march on up the coastal strip, which was much narrower than the eastern one. The sky grew more yellowish and a slight haze reduced the usual sharp clarity of the scenery. When he finally stopped twenty-eight miles from the ship, and got down from the trolley which he had been riding for the past three hours, there was a peculiar orange glow along the eastern horizon, the first real sunset Tansis had seen. He set up his tent next to the ribbon cover and a mile from the sea, and retired for the night.

When he struck camp the next morning and got ready to move off, the sky was noticeably yellow, and the haze had thickened so that the top of the mountain was an indistinct blur and features more than two miles away were indistinct. The odd thing was that there was very little low cloud about, and none was hanging above the top of the mountain as it commonly did. The change in the air was now so noticeable that he determined to analyse it when he got back to see if it was some great dust storm blowing across from the mainland.

When he had first landed on this planet it had been early summer in the northern hemisphere and it should now be late summer. The temperatures were lower on the island than on the mainland, but had been rising ever since he came, and were now about 30°C in the day falling to 15°C at night. Winds had been fairly steady from the east most of the time, blowing out from the high pressure area over the great desert, and were still from that direction. Anyway, it was only of minor concern – the main thing was to find useful minerals or any interesting life forms.

This time he kept close to the shore, and for the first couple of hours took his time while he observed the animal life at the water line. So far he had seen fifteen different kinds of creature, and although he stopped frequently to watch the water, and even waded out a few times, he saw nothing new. He gave up after a couple of hours and speeded up his march.

By midday, six hours later, he was nearing the northern end of the island. The coastal plain was five miles wide and quite flat, and the mountain began abruptly without foothills and soared up very steeply for a couple of thousand feet before levelling off into a shoulder which jutted north from the main peak. The mantle of ash and dust was deeper if anything, and no outcrops of rock could be seen in the flat dreary plain. Hour-glass trees still dotted it as they did everywhere else – there was a depressing sameness to this planet. Far away at the foot of the steep sides of the northern shoulder he could just discern the dark band of ribbon cover distorted and made greenish by the haze, which was noticeably getting worse by the hour.

He pitched camp for his midday meal with eighteen miles to go to the ship. He rested and dozed for a couple of hours, which by now was one of his fixed habits, understandable when daylight was sixteen hours long. His rest was spoiled by a persistent cough and an irritating tickling sensation at the back of his nose. He put this down to insufficient humidity in the air of the tent. On board ship the air was humidified by the life-support system and maintained at optimum conditions for health, but the camp equipment was a lot less elaborate and not half as efficient. Still, he would be back in the ship by nightfall, and then he should get rid of this cough.

But the cough got worse during the afternoon, and the tickling in his nose became a stinging soreness which spread into his throat. Tansis had never had a cold or any infection in his life, and no one else on that sterile and isolated space ship had either. The original expedition members who had set out from Earth had all been rigorously checked to ensure they had no latent infections and were not germ carriers, and after a few colds in the first month or two infection and illness became a thing of the past. The only thing Tansis could remember which was like his present discomfort was the time when he caught a whiff of chlorine gas from a piece of faulty equipment on the main ship.

He turned inland to cut a corner off the journey and came to the ribbon cover belt which lay right at the foot of the mountain slope. He intended to keep on the seaward side of

the cover and follow it back to the ship. As he marched along by the edge of it, giving it no more than an occasional glance, he suddenly thought that it wasn't quite the same as he had seen previously. He stopped and stared carefully at it. After a moment or two he realized what it was. The ribbons were dotted with small brown dots about the size of his little fingernail. The last time he had closely examined the stuff had been back on the mainland, and it certainly hadn't had such dots then. In fact, the cover on this island hadn't had them when he first landed, because he remembered examining everything to see what differences there were between island and mainland. Then the ribbon had tiny pinhead dots, hard to see unless you stared closely.

Perhaps the ribbon cover was different along this northern stretch of the island. He took some samples to examine when he got home. Then he pulled down a frond from a nearby tree to see if they were different too. The stiff ribbon of the tree was certainly different. The nodules along the centre line were far larger than those he had seen on the mainland, or on the trees he had been cutting down a month before. They were now an inch in diameter and raised up in the centre and practically touching one another. Either the northern end of the island had different kinds of ribbon cover or else the stuff had changed during the past month. He could check whether that was the case by looking at the trees near the ship when he got back. There were still piles of cut foliage lying about on the ground there, and although it was getting dried up by now it would serve as a comparison with the living foliage.

He was impatient to get back; his throat was worse, the cough was getting him down, and he had had enough of this expedition. Geologically he had drawn a blank, and there was little else he had found which was useful. The light was now even yellower and had dropped in brightness, and the haze had reduced visibility to a mile and held a hint of menace in it. He rode the last ten miles on the trolley, and by the time he was back at the ship, nightfall and the deepening haze were producing a very rapid end to the day.

He passed through the air-lock and the insulation, dumped the samples in the laboratory isolation chambers

and went to the medical cabin. His first concern was to look at his throat. It was red and inflamed, and he searched the cabinets for some sort of spray to ease it. He got a slight relief, but spraying his throat caused him to have a coughing fit which came from deep down in his chest and doubled him up with the effort. He left half his meal untouched because his coughing took away his appetite and he had difficulty in swallowing.

A worrying thought struck him. Suppose the dust in the air had got to him? It was too much of a coincidence that there should be this dust haze while he was outside and now he was suffering from an inflamed throat which he had never had before.

He set to work analysing a sample of outside air, a function which the ship was superbly equipped to do. The result was a surprise. The dust level was no higher than for the other tests made previously, but the organic material in the air had increased by a factor of eighty.

Tansis felt real fear. If organic material had got to him then he was infected, and he was now contaminating the ship. It must have been carelessness in applying insulation spray to himself when he was camping. Either the first spray administered in the tent, or the second spray in the air-lock as he came back into the tent, were not a total coverage. It had happened and he was for it, years too soon, with no preparations.

Tansis forgot all about the meal and a rest and set to work analysing the material in the air. He worked in haste, breaking things and making mistakes, filled with a sinking deadened feeling. He ignored his cough and his sore throat, so intent was he. By the middle of the night he had got his answer.

It was similar to the molecules given off by the ribbon cover, which he assumed to be its scent. The scent molecules were still present and in their normal quantities, but the new molecule was large and complex and contained nucleic acid chains big enough to be genes. The damned stuff was reproducing, casting out its reproductive nuclei by the billion, by the ton load, judging from the fog it was causing.

The yellow haze was the microscopic, the electron microscopic pollen of ribbon cover filling the whole world. It certainly couldn't be produced by this island alone, for it stretched out over the sea and lay all about the mountain – surely it must be blowing across from the mainland. If it was so bad out here, what must it be like in the tropical jungle?

He set about analysing his sputum and a swab of his throat. He didn't find the alien molecules, but he did find antibodies of his own which according to the computer had affinities with the molecules. They had been produced to try to counteract the latter, but they were not fully effective as opposites which could fit and mask the molecules, and he couldn't establish whether his cough and soreness were the result of the alien molecules or of his own antibodies. One thing was certainly established – this world had penetrated his defences.

Whether it was a fatal infection, a poisoning or just an allergic reaction only time would tell. He hoped it was an allergy like hay fever which was only temporary; but suppose it left permanent effects? One thing was certain: never, while he lived on this planet, could he camp out while the pollen season was on, and how long it lasted only time would tell. He was going to be stuck in the ship for some time while he waited for more answers.

CHAPTER SEVEN

Night was almost over and he had been on his feet nearly thirty hours. He went straight to bed without a meal and fell asleep almost instantly.

It was well into the afternoon when he awoke, and he anxiously examined himself to see if he was improving. His throat didn't seem so sore but he still had a cough. He was bringing up a lot of phlegm too, and there was still a tickling in the back of his throat that irritated him. He hadn't been sick, there wasn't anything unusual with his blood pressure, heart rate or skin. His lungs were a bit congested and his temperature was up one degree, but he hadn't lost his appetite. He ate breakfast ravenously.

At best the allergic reaction would pass away, at worst he might have trouble with his throat permanently. He preferred not to think of another possibility – that this might be the start of a fatal sickness.

He studied the ribbon cover he had brought in, working by remote control from outside a sealed inspection chamber. The enlarged nodules on the ribbons were packed solid with the molecular pollen, as he had expected.

That posed a puzzle. Why did the ribbon cover need to reproduce? It looked as if the stuff spread by root action and suckering. He remembered something else. Never had he seen any ribbon cover which looked dead or faded, apart from the damage he had caused. It always looked fresh and vigorous as if it never died, and indeed if it was a gigantic planetary root then it must be immortal.

It had covered every inch of the planet in one form or another, and there didn't seem any place left for it to put down new plants. He came to the conclusion that the enormous release of gene-bearing molecules was for the self-invigoration of the one planetary plant. This would ensure that it remained the same everywhere because of the world-wide mixing of genes, and would stop genetic deterioration. The molecules were all the same – there didn't appear to be

any division into male and female gametes. It wasn't reproduction but self-invigoration.

He remained inside the ship for six weeks, feverishly studying medicine and bacteriology, running tests on air samples, making tests on human tissue cultures. He had to find out if it was possible to face the environment without insulation for at least part of the year. He knew now that for one reason he must always be inside the ship, and there must be sufficient insulation for the rest of his life to enable him to enter and leave the ship while that season was on.

Giving himself a hopeful seventy years of life, he asked the computer to calculate the minimum reserve of insulation film and warn him when he was down to twice that amount. That would be a couple of years away. From now on he would only go out when he had to, and he wouldn't use the tents again. It was difficult and risky trying to apply insulation from a hand-held spray. The expedition manual laid down that members should use tent air-locks in twos and apply the insulation to one another. The first film was transparent but the second film was red, so that it was easier to spot any areas missed. Tansis had had to twist round, spraying it on his back from over his shoulder, and it was no wonder he had left some part of him uninsulated. From now on he would live in the ship and go as far as he could walk in a day.

The coughing and irritation in his throat remained, and got worse when he was tired. He suffered from headaches and from pains in various parts of his body, but he couldn't be sure whether these were real symptoms or self-induced ones.

He drove himself on, working long hours, studying and researching. He was now permanently depressed by the shock of his infection, and by the fear of future disaster and a loss of hope. It was certain now that he could never go fully native.

He had long been talking to himself, but now he began to find former members of the expedition appearing before him. He talked to them and explained what he was doing. He came to his senses sometimes to find himself giving long

elaborate lectures to a roomful of imaginary people. The commander began to appear among them, and kept standing behind him as he worked, asking stupid questions and giving impossible orders.

Tansis argued with him, and the confrontations became more and more bitter and violent. He would come to sometimes and find himself shouting abuse at an empty room. He started taking tranquillisers and cut down the hours he worked, but he was obsessed with his problems and had to keep going back to the laboratory or the computer.

The commander was everywhere, and Tansis was sometimes so angry that he would rush him and punch him. He would find himself thrashing at the air with his fists. His heart would be pounding, his muscles aching with the improper use of them, for while they were aiming blows another part of him was restraining them. His heart palpitations got worse with these fits, and as he couldn't be sure if all this was due to the pollen he had taken into his system his anxiety and stress worsened.

During this time the pollen density outside reached a peak, fell, rose again but only to half the strength of the first peak, fell once more for a day or two, then rose to almost as much as in the first week, held it for a fortnight, then dropped rapidly. It peaked slightly once more and then dropped right down to nothing.

He assumed that the first deluge of pollen must have come from the tropics, and then as the season moved northwards the desert vegetation became active, then the temperate zone of the great river basin, and finally a minor dose from the distant sub-arctic region. In each wave of pollen the molecules were all exactly the same.

The commander wouldn't agree and ordered him to go to the top of the mountain and establish that all the pollen was coming from up there. He said that the haze was flowing down the mountain, whereas Tansis could plainly see that it came in from the sea. Tansis hated him for giving orders that put his life at risk to prove a stupid theory. He refused point-blank to go, and kept fighting the other senior officers who tried to arrest him for disobeying orders. There were times when he couldn't go to the command cabin because he

knew they would all be there, and he would have to fight them again to get to the computer.

When the pollen count sank to zero his coughing stopped. Presumably there had been a few molecules in the air of the ship brought in by him or coughed out, and as he kept on breathing them in they reacted to his body defences. Despite repeated analysis of the ship's air he had never found any, and the alarm system had not reacted, so the number of alien molecules must be very small indeed, but they were enough to keep his allergic reaction going. With the end of the pollen season they must have broken down and disintegrated. If he reacted like that to a handful of molecules, what would he do with a full dose at the height of the pollen season?

After a week of zero readings he went outside for the first time. Progress with his studies had been dispiritingly slow; he had so much to learn, and so much depended on it. He knew he was ruining himself with overwork, but he had to keep on as long as the ship functioned and stores of everything still existed.

He had now set his aims a lot lower. He hoped to be able to bear contact with the environment for at least part of the year, using the ship as a safe refuge at times like the pollen season. With enough energy he could keep the life-support system going, and he could live on processed algae from the ship's tanks. He had learned how to process the stuff, and had found that the materials required were recoverable from the ship's systems, so that it would be a permanently recycled operation and he wouldn't run out of the reagents required and could eat as long as the ship functioned. Therefore it was crucial to augment the energy supply. He had to finish the tower and platform and set up the generators and wind vanes.

He resolved to work continously at it until it was done. It would help take his mind off other things, and the physical work would relieve his mental stress. He was getting scared of the way he lost his senses for minutes at a time while he shouted and fought with imaginary enemies.

This time he didn't live in the camp, for he could never trust those spray cans again. He stayed out all day in his suit

and just got used to its inconveniences. Each day he went out to cut timber, shape it, haul it up and fasten it together. He cut planks by cutting the trunks lengthways – easy enough with a laser beam. He did all his carpentering on the platform at the air-lock, which had an external power-point.

In a week he had built his tower to seventy feet and was busy putting in platforms at each ten-foot level. He spent another week assembling stair ladders at each level so that he could easily climb to the top. He felt a tremendous sense of achievement when the tower was finished. He had at last accomplished something. He stood at various distances from the ship admiring it. It satisfied a deep psychological need in him, something much more than a solution to the energy problem.

If he couldn't solve many of his problems because they involved mental work and a grasping of abstruse concepts with, usually, inconclusive answers, at least with the tower he had conceived, planned and built something solid and as tall as the ship, and that answer was final and tangible. Perhaps, too, it was a symbol of escape, or a strengthening of his ship. Whatever the subconscious symbolism, it deeply satisfied him.

He was calmer now and didn't have his fits of rage any more, and his hypochondriacal aches and pains had disappeared. His imaginary colleagues didn't quite vanish; sometimes he found himself explaining the construction of the tower to them, and he still chatted steadily to himself. The commander stayed away, and Tansis only felt his ghostly presence when he went to the command cabin at night. Although he consciously tried to banish the man's morbid presence and remember that he was talking to himself, his actions in the command cabin were always self-conscious, as though someone watched him.

To make the platform round the nose-cone he cut down another hour-glass tree and cut through it again a foot above the base to produce a circular disc ten feet in diameter. He then cut out a hole in the centre of it five feet across. This gave him a large wooden ring which he took to the top of the tower and managed to get over the nose-cone. Then he sawed through three more trees, cut more discs, and rolled

them back to the ship. Here came the tricky part. He had to cut them into sectors like the slices of a cake so shaped that they would fit together round the cone and rest on the wooden ring and overlap it by another two feet. It took him an hour or two drawing and cutting out shapes from round sheets of paper before he got the sectors right. Then he sealed them up and cut them from the discs with the laser. They weren't a perfect fit, but they made a good adequate platform four and a half feet wide. He spiked them on to the ring.

Finally, he cut a large number of planks from the two-foot-thick trunks and fixed them on top of the platform so that they radiated out like the spokes of a wheel. This gave him a circular platform fitting round the nose-cone ten feet wide, and he finished it off with a floor of strong, lightweight panelling from the cabin walls of the ship.

The whole job had taken him four and a half weeks, and although it had its puzzles and small mistakes it went smoothly and without frustration. Tansis had found his true vocation.

He now had to adapt the generators and fashion wind vanes and bearings for them. Six of the eight generators were still in store in the ship, and he could work on them there. Two were now outside and could not be brought in again because they were uninsulated. He would have to work on them outside, which would be inconvenient, but for the time being he concentrated on the six inside the ship.

To make the wind vanes he started cannibalizing the ship, cutting out thin metal sheeting from the inner hull in parts of the ship which he didn't use. He cut and shaped the metal sheets into vanes, and welded them on to the cases of ring bearings which he pinched from the powered trolley.

A week later he hauled up six wind-powered generators to the platform and spiked them into position. He connected power lines to the master unit on the hull a few feet away, checked out the circuits and switched on.

Inside his suit Tansis was never conscious of wind unless it was so strong that it impeded his movements, but he knew wind was almost always blowing across the island from east or north. All but one of the vanes were turning and the

generators running, and after some tinkering he got the last one going. The wind at the moment was a moderate eight knots, but it often blew at twenty, and during stormy weather it rose above fifty, which he certainly felt because he had to watch his balance.

The rest was now up to the computer. It was monitoring the flow of current from the wind generators and reporting to him. The flow of current was one-fifth of the ship's generator, so during storms it should equal it. With two more wind-generators in service the proportion would be even better, and if winter was a stormy season then the ship's generator could be off altogether for most of the time.

He instructed the computer to keep a continuous monitor on the current and use the ship's generator only to back up the wind generators and the battery bank. It was also to monitor fuel consumption and calculate how long it would last now that wind power was available.

Building the tower and platform had been a good holiday, and Tansis had regained his health and mental equilibrium. It was a pity he couldn't stay outside and busy himself on building work, but he knew he had to be in the ship wrestling with his studies.

He spent another two months inside culturing bacteria and their reaction with human tissue, and boredom and anxiety returned. He was talking to himself all the time, and sometimes shouting at enemies who tried to stop what he was doing. The commander had ordered that he should stop, it wasn't necessary, it had been established by the research teams that there was no danger. He ordered Tansis to go out unsuited, and Tansis swore and cursed and fought with the officers who came to pass on the orders. Yet Tansis wasn't mad; he knew he was having these fits of rage and he kept stopping himself, but again and again he would come to and find himself shouting again.

From what he had discovered so far in his experiments, the bacteria in the desert air were very few and human tissue didn't react at all to them. On the face of it, it looked as if the air was safe, but how could he tell, from the way artificially-reared blobs of tissue behaved, how a whole human body would react? In fact, how did medical science

ever learn how bacteria reacted with the whole living body except through the grim process of trial and error, health and sickness, life and death? And on this world there was only one human body.

Tansis was, in fact, looking for malign reactions in the tissue cultures so as to justify not taking the final plunge and exposing himself to the environment. He couldn't admit this to himself, but it showed in his bitter, virulent confrontations with the chief medical officer, who was taking the commander's place as Tansis's main hate.

The commander never appeared now, but remained up above in his cabin and though Tansis knew he was being neurotic he couldn't enter that cabin, and even moved quietly when he had to pass the door. At least he could get to the computer and brush aside the other officers, for he didn't fear them, but he couldn't have faced the commander.

His mother and sister were often with him now, admiring what he did and encouraging him. It was mostly to them that he found himself talking and giving his lectures.

He had not married. That was a misfortune of space life. The first generation to leave Earth on that expedition had had too many children, in spite of all the pills in stock. Halfway to Capella the population was dangerously close to the maximum for life-support, and the youngsters had been forbidden to marry until they were thirty, and then permitted to have only one child per couple. For Tansis the disaster had come too soon for his hopes of marriage and a family. Strangely, he never thought of his fiancée: she rarely appeared unbidden to people his loneliness, and even his father appeared only seldom. It was always his mother and sister who accompanied him most of the day.

During those two months he had to go out half a dozen times to fix malfunctions in the wind generators. Being home-made, they could never be perfect and run without repair and maintenance. He hadn't taken that into account. If he had to keep going out to fix them he would use up the insulation film in a lot less than a lifetime. It was even more imperative to find out if he could risk going outside unprotected.

The stocks of food were another worry, for they were

quickly running down. All his favourite meals were gone, and very little meat protein was left. In another two months he would have to exist entirely on food processed from algae. At least he had solved the main problem for processing food, but the dwindling away of his stores frightened and depressed him. This world was inexorably gripping him closer, trapping him and stripping away his earthly world.

He could process algae, but there were no flavour concentrates left to make it tasty or fillers to make it chewy or filling. He would need to make Capellan sludges just to put some sort of taste into it.

The best taste, and also the best source of vitamins, was the pink sludge made from the protozoa in the pools at the tops of the ribbon trees, and they happened to be at the top of that bloody great mountain. He could only haul down ten gallons at a time, and what a cost in effort that was. If only the damned trees grew down here. Supposing . . . he had a brain wave. Supposing he got a large tank going in the ship and cultured them. He might need to go up occasionally and bring ten gallons down to top them up and refresh them, but there was no reason why he couldn't cultivate the stuff down here; it was only water that was missing in this desert, and that was the only reason they weren't down here.

After further thought he decided that it would be best to cultivate a tankful outside the ship. He didn't want to contaminate it, and the protozoa should grow better in the Capellan environment anyway. As the stuff grew in a pool in the wood of a tree, he would make the tank out of wood and set it up under the ribbon cover to cut down evaporation. That would give him something else to build with his hands.

He spent a week cutting down a dozen hour-glass trees and slicing them into wide planks six inches thick. Working under the cover he fashioned the base of the tank with two layers of planks, glued together, one layer running opposite to the other. He constructed the sides in the same way and had a tank ten feet by eight feet. He spent four weary days bringing water from the well a thousand feet above the ship,

until the tank was three-quarters full and the water two feet deep.

To prepare for the expedition up the mountain he made a pair of plastic galoshes to fit over the insulation on his boots which he could put on once he was outside. He spent a day climbing halfway up the mountain with air-tanks and the water-tank and the trolley, and left them to collect. He took it easy, spending all day on the climb, and didn't find it exhausting.

After a day's rest he then set out for the top. For the first four thousand feet he was unburdened and didn't hurry. Still fresh when he reached the cache, he then climbed slowly to the tree-line and rested for an hour. He got his water-tank filled, using a siphon this time, and set off down again. The journey down was the hardest part, and he was tired and footsore by the time he got back, just as night was falling, but he now realized that the climb was well within his capacity as long as he made advance preparations and took it easy.

Next day he put his container full of protozoa into the big wooden tank, and as a finishing touch he stuck into it several dozen of the stiff ribbons from the hour-glass trees and hoped they would give the protozoa a suitable environment. He was now cultivating a Capellan crop, and felt he had taken a great step forward. He spent another day collecting sea-plants and processed them into the sharp, sour-tasting sludge.

From now on food processing was to be a regular duty, and so was the cultivation of protozoa and the collection of sea-plants. He decided not to bother making any more sludge from any kind of ribbon cover; the tingling sensation that he remembered from the hour-glass tree sap was something he didn't trust. Ribbon cover was too alien altogether to use as food.

Yet once again he was committing himself to more work outside the ship and more occasions for passing through the air-lock and using up the stock of insulation film. The day of reckoning, when he would have to go outside unprotected, was getting nearer. This put him in a dilemma, for once he stopped using insulation he would contaminate the ship as

soon as he came back inside. Supposing he went outside, opened his helmet and breathed Capellan air and found it smelt too unpleasant to bear, or it started him coughing again or made him ill, he would still have to come back into the ship and spoil its sterile air. How could he take the first step without making it an irreversible one? He couldn't stick his head in the sample chambers in the lab while he made the experiment, for they weren't designed for that. The only way he could think of was to wear a respirator underneath his helmet and alter the suit so that he could breathe the outside air for a while without taking his helmet off. Even so, when he came back in he would be bringing the contaminated respirator in with him and he would be breathing out whatever he had picked up from the air. The problem was insoluble.

He decided to shelve the dilemma until the insulation supply finally ran out. Then he would have to spoil the ship, but at least till then he could stay healthy. It was a solution of sorts, and it took a weight off his mind. He would do everything he could to solve his problems and make every preparation he could, but on the day he would have to trust to luck. That would be the final shipwreck, and apart from the pollen season he would have to go native.

The long summer was over and the temperature was dropping. There was more cloud on the mountain top and the wind direction shifted frequently. Tansis hoped that the bacterial and molecular count of the air would fall as winter drew on, and he analysed the air daily to find out.

Whether from fatalism, or from an unconscious conviction that the air wasn't dangerous except during the pollen season, he stopped trying to keep his trips outside to a minimum. He went out whenever the wind generators needed fixing, he visited the big tank every other day to see how his crop was getting on, and made various experiments with it. He took another trip up the mountain for more water and also brought some ribbon tree foliage as well to stand in the tank. He converted another generator to windpower and fixed it to the platform, giving him seven for power and one free for outside jobs. He fixed the solar cells

on to the tower as well and plugged them in.

By now the computer had had time to get a three months' average for power flow, and had estimated that the ship's generator was only required for one fifth of the total energy needs and that the remaining fuel supply, augmented by wind-power, should keep the ship going for twenty-two years. This wasn't as long as Tansis had hoped, but it put off shut-down for a long, long time. He hoped that the rest of the year would be windy.

Tansis had now passed a turning point, and he knew it. He was happy and relieved that his power problem was over, at least until he was fifty, and by then he ought to know a thing or two. He knew he wasn't going to starve, although he was going to have to develop some very subtle taste buds. He would have the computer for companionship and guidance, and at the rate he was studying he should be a veritable Leonardo in twenty years' time. The insulation film was running out but it didn't fill him with the old dread. His bacteriological tests were wholly negative and he went in and out of the ship daily, feeling a little guilty but still doing it.

For the first time he was at a loss to know what to do that was absolutely immediate. He had been working in crisis for so long that when the crisis passed he couldn't put his mind properly to the dozens of smaller tasks that needed doing. But there was one thing he wanted to do that he had put off. He had never forgotten the faces that had peered up at him through the window of the boat. They appeared often in his dreams, inconsequential rambling dreams, in which he was going on some long journey with the sea creatures – he never knew where or why, and the dreams never ended clearly, but they kept recurring over and over again.

For several more weeks Tansis cultivated his tank of protozoa, which to his great satisfaction had multiplied and turned the water into the same organic soup that was at the top of the trees. He was able to make a meal of pink sludge from it, and regarded this as a great achievement.

One day, as he was coming back from the well, he passed

pile after pile of withering foliage chopped from the numerous hour-glass trees that had been used in his building operations. It bothered him to see such a waste, and when he was back inside he asked the computer what long thin strips of foliage had been used for on Earth. The computer immediately listed a long, long list: basketry, mat-making, rope-making, raffia work, cane chairs, weaving, wickerwork – on and on it went, for this was the sort of problem the computer excelled in.

All these things were new to Tansis, for there are no long strips of foliage on space ships. What, he asked the computer, was the most suitable of these handicrafts for a material like ribbon foliage?

Mat-making, was the computer's reply.

So after learning what the computer knew on the subject, Tansis wove a mat. Then he made a frame and wove one properly, and then another and another – all outside, of course, in his favourite place under the ribbon cover. He placed them on the platforms of his tower as flooring. The first one he adorned his tower with blew away in the night. He hadn't anticipated that. He thought of wind in the way a native of Earth might think of electricity and magnetism – that is, as a natural force which could drive generators. He wasn't used to weather. He never did find his first mat, but the others he made he fastened down, and eventually he had one on every platform. Fully dried, the ribbon was a dove-grey colour with an attractive network of fine white lines.

The computer's long list of handicrafts had interested him, and he learned a little about each one. He was particularly intrigued at the idea of weaving from different coloured strips. He made dyes in the laboratory, coloured the ribbons in various metallic dyes, and then wove mats with patterns. He started a long-term project in which he was going to cover several square yards of ground under the ribbon cover with multi-coloured mats.

He also invented a game. After he had finished cutting discs and planks out of the hour-glass trees, he had a lot of small two- and three-foot discs left over which he hadn't found a use for. He amused himself bowling them along

hard flat patches of the desert, trying to see how far he could roll one before it fell over. Then he tried bowling one at an object like a stone to see how near he could get to it. Finally he stood a group of them on end and bowled at them to see how many he could knock down. He couldn't play that particular game under the cover because the ground was covered by roots, but he got into the habit of having a game every day on a hard patch near the ship which he cleared of stones.

After a couple of months of all this his curiosity and urge got the better of him, and he walked down to the southern end of the island to have another look at the rocky bay where he hoped he might go sailing one day.

He stood on the hill overlooking the bay watching the water, hoping to see the sea creatures again. In his dreams the mysterious journey always began in this bay, and he had a feeling that this was the place to find them, if they were in the sea around this island.

The water was rough, and waves and spray flailed about the rocks on the shore. For a long time he watched in fascination as waves covered and uncovered the long jutting outcrops of rock which stretched out into the waters of the bay. The sight of the sea in constant movement and change, the white clouds of spray, the violence as they smashed on rocks which never gave sign of giving way or suffering damage, kept him absorbed. Then, unmistakably, he saw one of the creatures moving in the middle of the bay. It swam along with the waves and leaped out in front of them to splash in the trough ahead. Again it moved into a wave, and then disappeared to emerge seconds later at the moving front and leap forward to race it and leave it behind.

Happy and excited at seeing the creatures again, he started to hurry down the slope to the shore. Throughout all the months of study and labour and worry he had been hoping, and yet reconciled to disappointment. Perhaps they were only found on that coast of the mainland. Perhaps they never ventured far out into the ocean. He had probably spoiled his only chance, but he kept thinking of the time when he had nothing urgent to do and he would be able to search for them again, and there they were and he hadn't

had to go out in a boat to see them.

Halfway down the slope he stopped. If he went any lower he wouldn't be able to look down on the bay, and his view would be obscured by spray and waves. So he stood halfway up the hill and studied the creature through his binoculars. How powerfully it moved, even though it had no limbs. It had long fins pointing back along the top and underside of its body; they rippled as it moved, and there was a complex movement going on at its rear end, which widened out, as the front end did, but had many small fins arranged round it. The rear provided most of the propulsion through a blurred, flickering motion in the tail fin.

He wondered if the creature could see him, but it gave no sign. But then, why should it? There were no land-animals on this world. To such a creature the land must be empty and uninteresting. He must go sailing again and make contact. He searched across the bay through his binoculars to find others. He saw none, but it was difficult to spot things in that restless, heaving sea. He was lucky to have spotted this one, for it was a small object at this distance, and much the same colour as the sea.

When he looked again for the one he had seen, he couldn't find it. He spent ten minutes tracking about the area where he had first seen it, but it had vanished into the confusing waves and foam. Anyway, he knew they existed here, and the discovery raised his spirits and gave him something to look forward to and something important to do. If they were intelligent and he could make contact, it might turn out to be the most significant thing he ever did here.

On his way back to the ship on this casual, unprepared walk, he thought about sailing. There were drawbacks – for one thing, the sea was much rougher than it had been the first time he sailed. He couldn't stand the thought of being seasick again. The roughness would probably get worse as winter wore on. He didn't trust that inflatable raft on such a sea. It was so small and it bounced about on the water like a cork, and he didn't fancy his chances in it.

All the way back, a fifteen-mile hike, he was deep in thought, scarcely noticing the country he went through. He was good at building things, and there was plenty of wood.

Why not build a real boat, bigger and heavier and more seaworthy than his bobbing little raft? He could hardly wait to get back to the ship and ask the computer for information about boats.

He spent a long evening learning about boats – all kinds of boats. He realized that boat-building was an ancient and considerable skill; unless he built properly the craft would soon sink, and building it to the necessary standard would take a long time. When he checked his stores he found to his great disappointment that he didn't have sufficient spikes to fix the timbers of a boat together. Indeed, his building operations were nearly at an end. The ship had not been stocked for building, and what it had Tansis had used liberally in building his tower and the tank. It was useless to expect to build a boat without securing the timbers and caulking it.

After another day thinking about it all, he reluctantly concluded that he couldn't build a boat, and that a raft of timber tied together with rope wasn't strong enough. Even if he built one, how was he going to get it to the bay? If he built it at the ship he would have to sail it round the island, and he wasn't going to go on such a long voyage in an untested boat. If he built it at the bay he would have to carry all his tools and generator there, and have a fifteen-mile walk before starting work each time.

In the end he decided to try and make contact by standing at the end of one of the long rocky outcrops and attracting attention with signal rockets.

He set out again for the bay, wearing his home-made galoshes and taking with him rockets and an air purifier for recharging his air tanks. The large motor-trolley was now out of action with its bearings being used by the wind generators, so he loaded up the hand-trolley and pulled it the fifteen miles to the southern bay.

Standing on the slopes above the bay he looked for the sea creature again, but after half an hour gave up and went down to the shore, scrambling along the biggest of the jutting rocks. At first the going was easy and the rocks fairly even, but as they came down towards the water they became slippery and every crevice and hollow was filled with sea-

plant. Tansis noted with surprise that the plant grew in an almost solid line along the rock at water level. Evidently the stuff liked this kind of rock, and this was the place to gather it. It was a pity he hadn't landed the ship at this bay – it would have solved a lot of problems.

He had to go forward with great caution, and he was thankful he wasn't standing on boots coated with insulation or he would have gone straight into the water. Very slowly he picked his way to the end of the rock and wedged himself into a large crack about fifteen feet from the end of a natural jetty and just above sea-level.

As he looked out at the heaving, rolling water he was grateful for the solidity of the rocks on each side of him. The waves rolled unceasingly forward and past him and poured across to within a few feet of his refuge. Every few minutes a large one would smash against the rock and throw spray over him. The first few times he ducked and tried to avoid getting wet through before he realized how silly it was; nothing could wet him with his suit on.

Down here, almost level with the water, he couldn't hope to search the bay for creatures, and he would have to rely on rockets to attract their attention and then wait. He got out a rocket – a foot-long cylinder which he held in his hand at arm's length – and pressed a button. With a thump and a whoosh the rocket rose upward, leaving the shell of the cylinder in his hand. Two hundred feet above his head it exploded with a brilliant flash, and red and green streamers fell slowly back to the ground.

Then he waited.

The water rose and fell endlessly, and he could hear the roar of it all around him. Upwards and downwards, upwards and downwards. He watched it fascinated. Each wave was different, yet they were all the same. A sudden wave hit the rock at his side and water poured across him. Another large wave rose and rose and the end of the rock disappeared and water lapped up as far as his knees, then just as suddenly it fell away and the rock was in front of him again.

He felt a sudden nausea and went cold and shivery. With dread he knew what was going to happen, and it was going to be sudden this time and quite certain. It wasn't going to

pass off, he was going to be sick. He could feel the vomit rise in his throat, and he felt desperate. It was far too late to get back to land. He couldn't face all that slithering and slipping for five hundred feet when he was going to be sick any minute. He couldn't face fifteen miles in a stinking, misted-up helmet either.

Suddenly he drew his knife, cut the insulation film at his neck, snapped the catches and twisted his helmet off. This was it. Anything was preferable to spending all day in a fouled-up suit. He was only just in time. He leaned over the boulder at his side and was sick. As he looked up, exhausted and watery-eyed, spray slapped him across the face, taking his breath away. He was just about to be sick again, but the sudden shock of cold water made his stomach think better of it. The nausea receded. His arms and legs were trembling and he leaned against the rock, head down, while he tried to pull himself together.

Water flowed towards him again until he seemed face to face with the sea at the very end of the land. Now for the first time he smelt it. Wet and salty, but with another smell that was quite pleasant. He could only describe it as a smell of freshness and purity. For one born and raised in the artificial environment of a spaceship he was so used to staleness and recycled air that really fresh air was a new experience.

He raised his head and put his hands to his face, which felt as if it was being slapped and knocked about. His ears ached, and there was a rushing, whistling noise in them. This was his first encounter with wind. His eyes were smarting and his face was wet, and he could taste salt.

For a first encounter with the elements he couldn't have chosen more overwhelming circumstances if he had tried. Here at the very end of a rock jutting into the sea, down at the level of the waves with a twenty-knot wind whipping up spray, and he was breathing Capellan air.

Realization that he was breathing an alien atmosphere now fully sank in. He breathed carefully and examined the experience to see if breathing felt any different. It was difficult to think with the clamour in his ears, the water rushing all round him and spray hitting him in the face. He

would have to get back from all this; he couldn't cope with it all. Still clutching his helmet, he staggered and crawled back along the rock until he was six feet above the water on a flat stretch of the outcrop. Here he sat down and took a deep breath, and then another, and put his helmet back on again. He did this almost without thinking, and felt an immediate relief as the noise was cut off and his face and ears stopped smarting. It was like going into a room and shutting the door.

Well, he had done it now. He had actually breathed the stuff and got soaked by the water. Nothing he could do now could prevent the ship from being contaminated, and things would never be the same again. His nausea was completely gone, frightened away by his traumatic baptism at the end of the rock.

He wondered if the sea creatures had seen him being sick. He stood up carefully and looked at the sea boiling on both sides of him. As he gazed down he felt drawn towards it and staggered to regain his balance. The sea was a damned dangerous thing, worse than space. He looked further out towards the wave-filled horizon, when a movement and a splashing just beneath the rock made him move forward on hands and knees and peer over the edge.

The sea creature was standing in the water gazing up at him. Its tail was down out of sight, half its body was standing vertically out of the water, and it was looking him straight in the eye. For several moments man and alien stared at one another, eyes locked. Of a certainty Tansis knew he was in the presence of a person and not a beast.

The eyes were white, with large purple pupils which flickered and changed size repeatedly. After a moment Tansis was surprised to see that the two pupils were flickering in a different way. While the right-hand one changed rapidly the left one remained dilated for long periods.

He felt he must say something, and felt tongue-tied. What is one to say on such an historic occasion?

The meeting of two sentient races must be a rare event in the history of a galaxy, let alone that of a planet. He could only remember the first lunar landing a century and a half ago, when language was a finer art. He said, 'I am from

Earth and come in peace,' and knelt with his hands in front of him. The sea creature made no sign that it had heard him, but continued to gaze at him with flickering pupils.

Tansis wondered what else to say. He pointed to himself and said, 'Tansis, I am Tansis,' and smiled and nodded.

The sea creature couldn't nod – that was obvious, as it didn't have a separate head – but it flicked the top half of its body. Surely, Tansis thought, this must be some kind of response. He assumed that the creature couldn't talk or smile – its face was like a concave bowl with a round mouth at the bottom of the bowl and two large eyes a foot apart at the top quarter of the circumference – so perhaps flicking the upper part of its body was one method of communication between different members of the species.

He wondered if it had any sense of hearing, and whether he could make a loud noise to test this idea. He took a deep breath and shouted as hard as he could. The noise nearly deafened him, and he suddenly realized that his helmet was on and he had been wasting his time talking to the creature.

He twisted his helmet off once again and stood bare-headed, smelling that fresh smell and feeling the cold wind on his face. Through watering eyes he saw the creature jerk its whole body; both pupils dilated enormously and then flickered in unison rapidly. He had given it a shock. Surely no one on any planet suddenly screwed his head off!

He opened his arms wide and again the creature jerked and moved backwards, staring at him from several yards away. He had suddenly removed his head and then changed his shape. Tansis felt mortified. He was frightening it away.

He dropped back on his knees and called out to it, 'I am Tansis and I come in peace.' He repeated this three or four times while the creature watched him.

Then it moved closer to the rock until it was right under Tansis, staring into his eyes. Its left pupil expanded to a great size and remained large while the right pupil expanded and contracted for a second or two, repeating this movement several times with a brief period of immobility between each cycle.

Tansis suddenly realized what it was doing: it communi-

cated with its pupils. He was excited but nonplussed. No human being has voluntary control of pupil dilation. It is one of the few certain ways of judging what a human being really thinks and feels about something.

All through this encounter the alien had made no sound and had given no indication that it could hear what Tansis was saying. Perhaps it made sounds that could be heard in water, which was a better medium for conducting sounds than air; if so, why should it be equipped for hearing sounds in air when it did not live in it and when this world was such a silent place anyway?

There was a great gulf between the two of them. They lived in different mediums, used different senses and communicated with different organs. The creature could not speak, and Tansis could not flicker his pupils. How could they ever learn to communicate?

There was a long pause while Tansis remained kneeling and the sea-creature moved slowly backwards and forwards in the water. Then the creature suddenly turned and sank beneath the surface, and seemed to look along the length of the rock out to sea. Tansis stood up, and after a moment he saw another of the creatures moving from the seaward end of the rock towards his companion. They met and gazed at one another for two or three minutes. Tansis couldn't see their eyes properly, but he guessed that they were talking about him in their own fashion.

He wondered how the first one had known the second was coming even when it was at least a hundred yards away. It hadn't been looking in that direction, so did it hear it or smell it or sense vibrations in the water, or what? Just then both of them turned and gazed out to sea, and a few minutes later another creature joined them, looked closely at them from a distance of two or three feet while they told it the news, and then examined Tansis with obvious excitement and alarm. Two more came up to join them, and then another appeared, and Tansis found himself the object of attention of a crowd of six.

His face by this time was numb with the cold wet wind, his eyes watered and smarted and his ears hurt. He didn't dare put his helmet back on in case he gave them all a fright.

There was another pause while they all moved slowly back and forth and Tansis stood uncertainly, trying desperately to think of some method of communication. He rubbed his face, making it even wetter and colder from his insulated gloves. He would have to break off and put his helmet back on. They were at home and could stay here all day, but he couldn't, and he had breathed far too much alien air for the first day.

He bowed deeply, showed his hands and stepped back to the middle of the rock where he was out of sight, and then quickly put on his helmet. Oh, the relief! He turned the heat up in his suit and breathed warm air again.

The creatures had all moved back until they could see him again. He waved to them and then turned and picked his way back along the rock until he reached the shore. They followed him and moved slowly in the water a few yards from land as he walked along to where he had left his trolley.

Taking the trolley he climbed up the slope, turning every few yards to wave, but by the time he was a quarter of the way up the creatures had gone. He thought he saw glimpses of them moving out into the bay. Perhaps they couldn't see very far in air and he had walked out of their range of vision, or perhaps they had said goodbye too.

On the long trudge back to the ship his feelings were mixed. He had made contact. They were definitely intelligent. He now had the companionship of other persons, however wildly different from himself. But how was he going to converse with them? Did they have any culture as he understood the word? If not, this made the gulf between them even wider.

Then there was the even greater problem – he had now breathed the air and ended his insulation. He had really jumped in at the deep end. Was he going to die? Could he live in comfort and health in a ship that would no longer be sterile once he got inside? There was nothing he could do about it now. He was in the hands of the gods.

He hurried along mile after mile, his mind milling over these thoughts, not bothering to take a rest, heedless of his tiredness. He didn't know whether he should be happy at

meeting the aliens and relieved at finally taking the plunge, or frightened to death at the consequences. He felt both apprehensive and resigned, like a man about to be executed. Like many another before him he wondered why it had to be him, why he couldn't make it all not happen.

To reach the ship he had to cross the band of ribbon cover that ran around the island. He debated whether to take his helmet off again and have a sniff at it, for he had done so much today he might as well go the whole hog. He stood undecided at the edge of the cover and then shrugged and went up the lift and into the ship. Another time he would do it; he had done enough for one day.

CHAPTER EIGHT

He went through the air-lock procedure and stood in the inner lock cutting himself out of the double layer of insulating film. He pushed it all into the incinerator, and was reaching up to thumb the button that opened the inner door when the alarm bell rang and the computer screen by the door flashed on and off: 'ALIEN MATERIAL DETECTED. INNER DOOR SEALED. REPEAT INSULATION PROCEDURE AND EVACUATE ALL AIR FROM INNER LOCK. ENTRY CANNOT BE ALLOWED UNTIL ALIEN MATERIAL IS VOIDED.'

Tansis wasn't going to bother with all that nonsense. He was alien material himself now – his head, the inside of his suit, the air he was breathing out – and the computer would just have to put up with it.

He typed back, 'The emergency procedures now being followed are hereby countermanded by me by virtue of the lawful authority devolved upon me as sole survivor.'

'IT MUST BE POINTED OUT THAT YOUR ACTION COULD IMPERIL YOUR HEALTH AND YOUR LIFE.'

'I know all about that,' Tansis typed back irritably. 'It has been established that there is no known danger, apart from ribbon cover pollen. I have exposed myself to the air and breathed it without ill effect so far. The test had to be made and I have made it. The ship can no longer be sterile for I am no longer sterile. Open the inner door and accept the new situation.'

The inner door opened immediately and Tansis stepped into the assembly lounge. He felt he was seeing it in a new way, as though it were something innocent he was defiling. It was the end of an era.

The computer screen in the lounge flashed, 'ALIEN MATERIAL DETECTED'.

Tansis looked at it resignedly. No doubt this would happen in every room he entered until the computer had clocked up the full score of contaminated rooms. It was very conscientious – that was the right word – but very low on common sense.

That evening Tansis ate well and slept well. He awoke in the middle of the night after ten hours' sleep, refreshed and relaxed. The only ill effect he seemed to have was more mucous than usual in his throat and nose.

The biggest hurdle of all was now behind him, like some examination over and done with, and all the anxiety seemed to have lifted off his shoulders.

He had several hours before daylight, for the nights were very long here in winter, and he spent the time learning from the computer the various theories and speculations on how human beings could communicate with alien intelligences when they finally met them. None of the theories fitted the situation he was in. They all assumed that the aliens would have limbs and a material culture and some sort of symbolic system that could be translated into a visible form like writing or drawing.

Tansis felt sure that holding up a board and drawing on it would mean nothing to the sea creatures because they had no limbs and therefore couldn't externalize their mode of communication. Their experience of life must be intensely internal and their relationship to others must be a direct person-to-person meeting. Physically, from an earthly point of view, they were primitive and destitute, possessing nothing but their bodies; yet their interior mental world might well be far more advanced than the human one.

Communicating with them was going to be a problem; how could he copy their trick of flickering their pupils?

He coughed and brought up mucous. He seemed to be bringing up a lot since he had exposed himself; his nose was blocked as well, and he was having a problem trying to blow it and clear his throat and dispose of the phlegm. There were no handkerchiefs on board and no paper left. He prowled round the ship looking for something to use. In the end he settled on gauze pads from the medical cabin, and provided himself with a small stack of them wherever he sat down to work.

According to the medical manual and the computer he probably had a chill brought on by the cold sea wind, and he felt a gnawing apprehension which he tried to dismiss. Perhaps he was infected.

He broke off his researches into communication theory and ran a bacteriological analysis of the stuff he was coughing up. The result was negative, apart from a tiny number of alien molecules which belonged to the sea water. Evidently he hadn't absorbed anything significant.

By this time it was several hours past dawn, and he didn't know what to do. He couldn't settle down to his usual regime of studies, for the encounter with the sea creatures had left him restless and indecisive. He wanted to meet them again, but he didn't know what to say or how to say it.

His nose was streaming and his eyes felt hot. This was the first time he had ever had a cold, and he couldn't be sure it wasn't going to be something far worse. He decided to follow the advice of the medical manual, and he had a good meal and a brandy and went to bed. He spent an unpleasant week, half of it in his bunk, recovering from his chill and working in a lack-lustre way at a conversation session with the aliens. He felt ashamed of his failure to say anything to them – in fact, it was this sense of shame which drove him on, for he felt he just had to impress these creatures, get their respect and make them see how intelligent he was.

Tansis, lonely and threatened, was suffering from a sense of inferiority. He felt that the Capellans had a hidden culture within their minds far greater than his own, and though he hadn't a shred of real evidence for this the obsession grew all the same.

The commander re-appeared, and Tansis found himself having furious arguments with the senior officers because the commander thought the sea creatures were dangerous enemies and forbade him to go near them. They accused him of contaminating the ship, which made him go almost berserk with fury. Hadn't he been doing all the work, hadn't he taken all the bloody risks and been a martyr for them all? No one understood, no one helped him. He was surrounded by hostile authority, unreasonable and tyrannical.

After a week of this, Tansis had had enough and left the ship to set out on another expedition to the end of the island. This time he was going to keep his helmet on and spend several hours trying to talk to the aliens.

He reached the southern bay, parked his trolley under the overhanging rock and scrambled along the rocky outcrop until he was near the waves. He fired a signal rocket and sat down to wait about ten feet above the water, where the experience of the heaving waves was not so overwhelming. What fiasco would happen this time? Each time he had encountered the aliens he had had to retreat in ignominious circumstances. As he pondered gloomily on his fate, a not uncommon occupation of his, he saw four of the creatures standing in the water gazing at him. He picked up the portable TV set he had brought with him and positioned it on the rock so that they could see it. He watched them out of the corner of his eye as he did so, and felt disappointed. They watched him, but scarcely glanced at the object he had put down in front of him.

He knelt down and inserted a film cartridge, a documentary film of a space launching, but still they scarcely glanced at it, continuing to stare at his face.

After several minutes he removed the cartridge and clipped in another one which showed a group of people walking along a beach, an incident taken from one of the films in the ship's extensive library. Even though the film was of people moving, the aliens showed not the slightest interest in it. He tried a film on dolphins, which he had felt certain would interest them, but they never even looked at the set.

Tansis gave up. There was no common ground of experience here at all. These creatures only communicated personally and directly, and not through the medium of artifacts. It was obvious that the TV set was nothing to them. A bit of rock, flickering strangely, perhaps, but an object outside their own experience, part of the dry land they never entered. Only he himself, a person, had attracted their absorbed attention.

Tansis now tried another of his carefully-thought-out plans. He picked up a rock and held it out, then knelt down, put the rock in the water and splashed it. He pointed to himself, then to them, and waited to see their reaction. They continued to watch him but did nothing apart from a slow back and forth motion of their bodies, which might

be no more than an automatic stabilizing of their position in the water.

They had no limbs, so they couldn't point or pick things up. Did they realize what he was trying to do, and could they do anything analogous to it? He was trying to bring to their attention four things – rock, water, me, you – and then try to find some mutually understood symbol for each. How did they symbolize? Did they have nouns?

He had brought a cine camera with him in order to record the eye movements, and then slow the film down and see if he could make sense of them. He slowly brought his camera out, anxious not to alarm the creatures, and kept it at waist level while he recorded the alien's eyes for two or three minutes. That was almost the last bit of film he had, for he was running out of practically everything now.

An increase in the movements in front of him caused him to look up. The sea seemed full of creatures – dozens of them seemed to have appeared all of a sudden.

They were moving slowly inward in a semi-circle towards the four already there. A large cluster of them met a few dozen yards away from him and appeared to be engaged in conversation. Nothing happened for several minutes while Tansis wondered what they must be saying about him. Then all faced towards him as if at a word of command, and slowly drifted forward till they were almost touching the rock. He counted them – twenty-two; the news about him must be spreading around the bay.

Twenty-two pairs of eyes stared at him, and as he looked back their pupils dilated to enormous size and held his gaze steadily. He felt an odd sensation like the feeling preliminary to fainting, a sense of unreality, a quietness, and a slipping away of the immediate surroundings. Their eyes filled the world, and then he felt their presence directly, an animal presence like being very close to someone's face, yet with a watchful intelligence. He sensed directly their curiosity. They were asking him something, but he didn't know what it was. Now he knew beyond all shadow of doubt that they were persons, and they were trying to draw him into their shared mind. Yet he could not understand a single thought.

only the feeling of curiosity and perhaps a slight anxiety, perhaps a slight impatience.

If intelligent beings think in terms of symbols by means of which they particularize the world into parts and name each part, and then combine the names into symbolic patterns and thus recreate in their mental world the unity in diversity of the external universe, how can such symbolic systems be conveyed from mind to mind without some Rosetta stone which gives a translation from one system to the other? Tansis could feel their emotions and the texture of their minds, and he was experiencing what they felt, but he could not understand what they *thought*.

He hoped they could experience the texture and feel of his own mind, and tried to project himself towards them. He was no telepath and knew nothing about that controversial subject, but he did his best and followed his instincts. He realized that to go out to them he must take a chance and trust them. He tried to open to them and saw their pupils flicker as they voiced their thoughts in their own fashion.

He felt himself swaying, and seemed to be falling forward into their eyes. Suddenly, with a shock, his body-defence instincts took over, and he staggered to maintain his balance and stepped back several paces. The weird sharing of minds ceased abruptly and he was alone again, solitary upon a windy rock with the waves splashing around him.

The aliens had moved back a few yards, he noticed. Were they mimicking him or had the abrupt end to the mind-sharing given them a shock as well? He sat down, put his arm round a jutting piece of the rock for support and tried to plunge back into rapport with them. He wanted that contact, for it had brought home to him how lonely and isolated he really was.

Again the eyes gazed at him and seemed to grow and grow and draw him into themselves. He felt the same vertiginous sensation of falling and losing his grip on reality, and this time found his awareness of their inner being reaching to a deeper level. Warm and friendly, they wished him no harm. There was something about their experience of being which was indescribable. They were mortal and animal like himself, but they were not human in their experience of life,

and he didn't know how even to start describing what it was that was different.

He tried to radiate his own friendliness, and perhaps his loneliness too. He could probably do that anyway without trying. He lost track of time as the rapport continued, the creatures moved slowly back and forth in the water, never taking their eyes off him. He decided to think about himself, the story of his shipwreck and what he was doing here, hoping that something of the tale would get through to them. They were more telepathic than he was, and perhaps they were picking up more about him than he was about them.

He sat and thought, silently but as clearly as he could, trying to picture his story in his mind. Even if words couldn't be projected, maybe mind pictures could. As he pictured the story in his mind he seemed to become dissociated even more strongly from himself. He felt that he was with the creatures looking at Tansis. He seemed to see himself above them, above the water, in the brilliant light where the world ended, the strangest of beings shining with a light within his head illuminating his mouth and eyes. Tansis had the internal illumination full on inside his helmet. He was a being of mystery and wonder – he felt these emotions very strongly – yet they didn't fear him. Curiosity and expectation were the dominant notes. The telepathic rapport was one-sided, he realized, for they were drawing him into their shared mind more than he was drawing them into his solitary one. With odds of twenty-two to one that wasn't surprising, but he hoped he was getting across his yearning for company.

The experience of them began to lessen, and he noticed that individuals were turning away and that they were all moving back. They were bidding him farewell and he stood up and waved. As one, they turned right round to face him, gazed at him for a few seconds, and then began to swim away.

He watched them go feeling happy and content, confident that he would see them again. Then he slowly walked back on to the shore. He wondered how long he had been out on the rock with them and how far the day had gone. He

guessed, from the light, that it was late into the afternoon, but this was an intuition which he had acquired from experience, and it didn't tell him the time. He still hadn't got a thirty-two-hour time-piece, but he now carried a polarimeter which told him where Capella was in the sky, and he could tell the time to within half an hour from that.

It was very late, he found, three hours to sundown, now that the day was so short compared to the night, and he would have a long walk back in the darkness. There was no stars and no moon in the night sky of this cloud-covered world, and even though the strong electrical activity of the upper atmosphere gave the night sky a dim glow, with occasional bright patches on the northern horizon, the nights were dark indeed and he never ventured out in them.

His session with the aliens had lasted over five hours, and felt like half an hour. Where had he been for all that time, and how had he lost track of time to such an extent? He must have been completely dissociated for long periods. He began to worry about it. Might it be dangerous if he kept doing it? It was all right for them, for they were at home, not alone and vulnerable as he was. He would have to be careful, or he might find himself running out of air or forgetting to adjust the controls of his suit.

With a shock he suddenly realized his predicament. He was about to be benighted and he was fifteen miles from the ship. Four to five hours' walking – even longer if he had to do it in the dark. He couldn't face that, so he would have to sleep outside in the darkness. He had never slept outside in his whole life. He was all right for air, for he had a portable compressor and purifier packed in the trolley, but he would be hungry by the time he got back, for the food in his suit was a very limited supply which one sucked through a tube, and he had had half of it that morning. He would have to go easy on the drinks too, for he was always more thirsty than usual when he was wearing a suit. He was in no real danger physically, and in the last resort he could take his helmet off without immediate harm, but the thought of sleeping alone in the darkness, on the ground somewhere, filled him with dread.

He climbed up to where he had left his trolley, sat down beside it with his back to the rock and wondered what to do. Stories he had read came to his mind. Men sitting around camp fires in the wilderness, sleeping in blankets under the starry sky of Earth, happy stories in which camping out was fun. Should he light a camp fire? It would be a good idea, he decided, and then wondered how to get wood. He had no axe or saw, only a knife, and he couldn't get much wood with that. There was no dead wood in this world, so he couldn't just go and pick up some as it seemed you could on Earth. The ribbon cover was six miles away – should he go and camp by it and burn that?

He sat undecided for some minutes, and then started off inland. An hour and a half later he was beside the broad band of cover, and he set about gathering it for a fire.

He chopped at it with his knife and found that it took a lot of work to get a little pile of cut ribbons. Then he thought that he had better find out how it burned and how long a pile weighing about twenty pounds would last. To get a flame going, he ran two wires from the generator and tried to get them to arc against the driest-looking bit of ribbon. All he got was a bit of charring and a wisp of smoke occasionally, but nothing burst into flame.

After ten minutes of intense concentration, holding wires just far enough apart to spark, he was sweating and feeling stupid and useless again. Now he wouldn't have a fire and he was miles from the overhanging rock, which had been slightly comforting because it had a bit of a roof and a wall at his back. Sleeping right out in the open was even worse now, and the silence was oppressive. He should have stayed near the sea with its background of noise. The light was dimming now, and he wouldn't be able to get back to the shore before darkness came and then he wouldn't be able to find the rock.

He sat by the side of his trolley feeling depressed and ridiculous. He found it hard to believe he was actually going to have to sleep outside in this desolate silent wilderness. The dark abyss of utter loneliness opened up in front of him, and he felt close to weeping. His contact with the aliens had disturbed his defences against the old enemy. He had

grown a kind of shell, a habit of mind, which put loneliness at arm's length; now it assailed his very heart.

Darkness came, and then he found he couldn't distinguish anything except the dull gleam of his own white suit, the dark bulk of the ribbon cover to one side, and a dim greyish-greenish glow all over the sky which did no more than separate sky from ground.

The suit's alarm buzzed in his ear, indicating that his air supply was now on emergency reserve and needed recharging. He switched on the breast lamp, and by its garish light set up the generator and air purifier. He put out two extra tanks and linked them to his back pack to save him the trouble of recharging again in the darkness later on. As he pumped air into the tanks he debated whether to take his helmet off for a few minutes. He had been in his suit for fifteen hours, longer than he had ever had it on before; his face felt dirty and his eyes gummy, and he had a great desire to rub his face with his hands. He needed to blow his nose as well, and to clear his throat and spit; and while he had the helmet off he could have a drink from the sealed ration pack in the trolley.

His loneliness and anxiety made him reckless, and he undid his helmet and took it off. The cold wind made him gasp – he always forgot how cold it was now that summer was over. As he took a deep breath he felt a tickling in his throat. He rubbed his face vigorously and cleaned the corners of his eyes. He took another deep breath and coughed, and then had a fit of coughing and cleared his chest. This reminded him to blow his nose, and then he caught the scent of the ribbon cover, a harsh, sharp, acrid smell like burning cloth or hot metal. He couldn't decide what it did smell like but it was awful, and then a fit of coughing gripped him for several minutes. He was breathing heavily, and the smell was making the inside of his nose smart.

When he was partly recovered he screwed on his helmet, resolving never to breathe the stuff again. The tickle in his throat continued to make him cough even though he tried to fight down the urge. If this was what the scent did to him, the pollen would have killed him if he had breathed it. Of all the times he could have chosen for a first sniff, this must

be the worst. It was bad enough having to sleep rough outside, and now he had given himself a coughing fit just to make sure he didn't sleep at all.

His misery increased as he remembered that he hadn't taken a drink while his helmet was off. A drink might soothe his throat. He drank most of the remaining fluid in the suit supply and decided to drink and eat from the extra rations in the trolley when he could get a mile or two away from the cover in the morning. He would have to take his helmet off then anyway, after another eighteen hours cooped up in it.

He lay down on the ribbon cover. That at least was one advantage – he had a soft bed – but he had to lie on his side because of the back pack which he couldn't remove. He got up again, searched for the pile of cut ribbons that was to have been a camp fire, and made that into a pillow – not because it was soft, but to get his helmet at the right angle to his body. He got up again to stamp out a hollow to one side of him so that a jutting piece of his pack would fit and stop him from rocking. Then he got up once more to bring his trolley across and put it right beside him. It made the place just that little bit like home.

As soon as he lay still he felt restless, for the suit was not meant to be slept in. If he could have slept standing up like a horse he would have been more comfortable. The tickle in his throat kept returning, and his nose was running. He had to keep swallowing the mucous, which wasn't going to do his stomach any good. He tried to settle and go to sleep, but his thoughts churned around and he felt desperately alone. It seemed to him that he was doomed, and all the things he had managed to do since the shipwreck were a clutching at straws and could not save him from this savage world. How could he ever win against an entire planet? He couldn't join those alien creatures and make his home with them, he could only call to them across an unbridgeable gulf. The distance between the species was as wide as the miles of space between the stars.

He dozed and dreamed with extraordinary clarity. Dreams in vivid colour. He seemed to be flying and leaping effortlessly through the air, filled with exaltation. He would

wake and doze again and then terrifying nightmares came, drowning in the sea, being crushed by the overhanging rock, being executed slowly and deliberately by the officers of the ship. For hours brilliant, exalting dreams and terrible nightmares alternated in a mental cycle which he could do nothing to alter. His waking and dozing and dreaming went on and on and he was helplessly in its grip. When he was awake his lassitude was so great that he couldn't get up, and even when daylight came he continued to lie there, held fast in a pattern of disturbed sleep.

It was nearly midday when he finally awoke and found he could get up. He was muzzy and tired, and the taste in his mouth reminded him of the smell of that damned ribbon cover. The two extra tanks lying on the ground and linked by pipes to his suit air-tank stopped him from moving around and reminded him immediately to see to his air. If he hadn't doubled up his air-tanks he would have been dead by now, and he had only done it out of laziness really, because he didn't want to fiddle about with air in the middle of the night. He checked the time of day with his polarimeter. He had been asleep for nearly twenty-four hours, and it was the worst sleep he had ever had. As he recalled the dreams and the leadenness of his body, he realized that he must have been ill or drugged. Had the scent of the ribbon cover drugged him? He felt frightened as he remembered the ribbon cover was full of alkaloid substances like the narcotics of Earth. He had only smelt the stuff for a few minutes, and it had sent him on a twenty-four-hour trip.

He desperately needed a drink – he had never had such a thirst – and he knew he must drink or he would never make it back to the ship. He packed his gear on the trolley and set off for the nearest part of the shore on the eastern side. This would take him three miles from the cover and about twelve from the ship.

He was tired before he started, and ill from the effects of the alkaloids in his system and from being in a suit for nearly two days. The walk was an endurance test.

When he reached the seashore he found to his relief that the wind was coming off the sea from the south. He quickly undid his helmet and took a long hurried drink and then

some food, blew his nose, rubbed his eyes, and quickly put his helmet on again. He did it all in less than half a minute, and his stomach gurgled and protested at the sudden strain of having food and drink hurled into it in such haste.

He had to have a rest, he just couldn't go on, and he lay down in the sand for a few minutes.

He lost consciousness almost immediately.

When he awoke he was utterly disorientated for several seconds, and had no idea of where he was. When he remembered, he hurriedly checked the time. It was now late afternoon and in three hours it would be nightfall again, and he was still twelve miles from the ship. He could perhaps just do it. He was now in radio contact with the ship and could tune in to its direction maser. He called the computer and ordered it to switch on the external lights of the ship so that he could see it in the darkness. He still felt tired, for all that sleep had not refreshed him, and he was stale and sweaty and smelt like a polecat inside his suit. He pushed on along the shore determined to reach the ship at all costs. It was dark by the time he reached it but there were no further mishaps – he had had enough of those for one day.

The next day, still suffering from a cough and a feeling of tiredness and depression, he had a good long think about his situation. He couldn't live with the ribbon cover, that was now certain. Even if it was not directly toxic its smell was too unpleasant and would debilitate his mind with its narcotic effects, and if he was living in a doped state on a world like this he wouldn't last long. So he couldn't let the ship be contaminated with the scent molecules it emanated, yet this was bound to happen once the insulating film was used up. When he was outside he could always wear a suit and breathe purified air, and when the suit wore out there were nineteen more. He need never breathe the air of this world directly. The air-lock would continue to operate as long as the ship functioned, and the air in the outer lock would continue to be voided each time he came in; but whenever he came through the inner lock into the ship he would bring a few alien molecules and germs in with him, and these would tend to remain in the ship's closed air system as a constant irritation and hazard. It was the insulation film

which was the problem, and the devastating effect even a handful of alien molecules were capable of.

He would have to move as far from the ribbon cover as he could before the insulation ran out, and that meant going to the southernmost tip of the island where that curving peninsula pointed out to sea. There he would be about eight miles from the cover and a good two miles from the nearest hour-glass trees as well.

The more he thought about it the more advantages he saw in the move. Down there he would be on the southern side of the bay and could meet the sea creatures without a thirty-mile hike. It should be windy all the time, with the sea on three sides and the mountain ten miles away. It should double the output of the wind generators. Another thing – he would be close by a place where sea-plant grew in abundance, and that was the only thing worth converting into food.

The big snag was the tower at the side of the ship and the platform on top. He was very proud of that tower, built with his own hands, a victory over this frustrating world. It wasn't attached to the ship, which it wouldn't, therefore, stop from moving, but it would have to be left behind, standing useless in the desert, a sort of folly, a monument to false hopes and wasted effort, and he couldn't build another without spikes.

The platform he could take with the ship – indeed, he would have to, because he couldn't put it back up there without the tower to act as scaffolding. The generators on the platform would have to be removed before take-off in case of accidents, for they were too precious to risk, but where was he going to put them? He couldn't bring them inside because they were uninsulated. No – wait a minute – he could bring them in through the insulating film, giving each of them a separate coating and leaving them stocked in the stores. It was against the regulations, but what the hell, he wrote the laws around here now. On arrival he could take them outside again and cut away the insulation and put them back into service. In fact, he could do that with the big trolley and all the gear in the ribbon cover cave and the drilling equipment. That tank of protozoa would have to

be left behind, though; it was too heavy to bring up into the ship, and in any case it was too big to get through the air-lock.

He was most bothered by the thought of losing the tower. It made it so easy to get up to the platform, and gave him a sort of verandah outside the air-lock which was very useful. He would hate to lose it, and how was he going to get the generators back on the platform again?

He would have to try and take it with him.

He asked the computer to estimate the weight of the tower from the plans and the specific weight of the wood. Fifty-two tons was the instant answer. That was far too much weight to hang on to the ship. He asked the computer again, what was the weight without the conical feet on which the tower rested? Twenty-six tons came the reply. No wonder the tower never rocked in the wind. He decided to sever the feet from the rest of the tower and lash the tower to the ship with ropes and cables.

He ransacked the stores for anything he could use as rope. There were two hundred feet of nylon rope in twenty-foot lengths, a hundred feet of power cable, a coil of wire, strong plastic sheeting which he could cut into strips and plait together. There were sleeping bags and clothing for the absent crew of the ship which could be torn up and used. He spent three days making rope out of these diverse materials, and another two days trying to lash the tower to the ship by tying rope or cable to the timbers of the tower, passing it round the ship and tying it to the timbers on the other side of the tower. He started at the bottom where the ship was widest, and lashed up for two-thirds of the ship's height. Beyond that point the hull began reducing in diameter towards the pointed nose-cone, and consequently the tower stood away from the ship.

It needed to be a very tight lashing, and there were few projections he could use on the hull to secure the ropes to. He used a winch to get the rope as tight as possible on each pass round the ship's hull, and relied on a tight grip of rope against metal to last the few minutes of the flight.

Finally he rigged up a couple of TV cameras, one at the top of the tower and one on the air-lock platform, so that he

could see what was happening during the flight. That was all he could do; for the rest he would have to keep his fingers crossed.

He cleared up his camp in the ribbon cover cave and stored it all inside insulation film, picked up the pump from the well on the mountainside, and then remembered that where he was going there would be no well, and no suitable site for one within miles and miles. Well, you can't have everything, and he could solve that one later.

The last job was to remove the generators from the platform and return them to the ship.

He saw no reason for staying any longer. He climbed up and down the tower to check the lashing and then came inside and took his seat in the command cabin.

He ordered the computer to show a map of the island on its screen, and marked the destination point upon it. Then he commanded the ship to be moved on the fastest, most economical flight path, keeping it in a vertical attitude as far as possible.

There was a two seconds' delay, and the computer replied, 'THIS WILL DECREASE THE REMAINING RESERVE OF FUEL BY 9% AND DECREASE THE PERIOD IN WHICH THE SHIP WILL REMAIN FUNCTIONING TO EIGHTEEN YEARS 140 DAYS AT CURRENT RATES.'

'I know,' typed back Tansis, 'but the destination point is twice as windy as this location and I estimate the wind generators will double their output of power, thus lengthening the functional life of the ship. A further reason for leaving is that the ribbon cover is too dangerous for me and I must be as far from it as possible. As commander I order immediate flight as indicated.'

'THERE WILL BE A DELAY WHILE THE PROPULSION SYSTEM IS CHECKED OUT,' replied the computer.

Tansis made no comment. The ship had been motionless for months. After half a minute the computer flashed the all-systems-green signal and the engines roared to life.

The ship shivered as it started to rise, and the alarm bell clamoured. 'EMERGENCY', flashed the computer. 'THE SHIP HAS AN UNSTABLE MASS DISTRIBUTION WHICH CANNOT BE ACCOUNTED FOR.'

A shaken and chastened Tansis hurriedly told it about the tower lashed to the side of the ship.

'ALL MODIFICATIONS TO THE SHIP ESPECIALLY THOSE WHICH AFFECT ITS PERFORMANCE IN FLIGHT MUST BE NOTIFIED TO THE COMPUTER IN ACCORDANCE WITH STANDING ORDERS SECTION 112. IT IS HIGHLY IRREGULAR AND DANGEROUS TO OMIT SUCH NOTIFICATION.'

'I am sorry ...' Tansis started to type back, and then cancelled it. Why should he apologize? The computer wasn't angry – it was just telling him a fact. It was a machine for telling him facts, not a person to be mollified. A few more years on this damned world and he would be talking to it as if it were his wife.

'Allowing for a mass of twenty-six tons distributed along the lower starboard side of the ship from nose to tail, recalculate the flight path, maintaining the most stable and vertical attitude for the ship.'

'CALCULATION MADE,' answered the computer after three seconds, 'BUT ONE OR MORE PRELIMINARY LIFT-OFFS MAY BE NECESSARY TO ESTABLISH THE FACTORS BEING USED IN THE EQUATIONS.'

'Proceed,' answered Tansis.

There was a brief burst from the engines and the ship rose about ten or fifteen feet and settled back again. Tansis didn't notice anything unusual, but there was something the computer wasn't happy about. There was another brief burst, and the ship rose and fell once more.

'READY FOR LIFT-OFF NOW.'

'Wait while I check the tower,' answered Tansis.

He looked at the TV screen which showed a view looking down from the air-lock platform to the foot of the tower. The bottom section of the tower was on fire, and as he stared into the billowing smoke he saw that the massive conical feet were blazing furiously and flames were shooting up into the next section of the tower.

He leapt up, scrambled down the stairs and into the lounge, and rushed towards the air-lock, screwing on his helmet as he ran. Inside the air-lock, as he thumbed the button to open the outer lock, the screen flashed, 'HULL SENSORS INDICATE SUDDEN RISE OF TEMPERATURE TO FOUR

HUNDRED DEGREES C IN THE' 'I know, wait,' Tansis typed, and without explaining further he dashed on to the platform outside the air-lock. For convenience, he had left a box of tools in the outer air-lock to deal with any quick repair jobs that the tower might need on arrival. He was going to have to do an even quicker job before departure.

Grabbing a pair of bolt cutters and a sharp knife he climbed down the tower into the rising smoke. With a suit on he wouldn't feel any heat until the suit-cooling system got overloaded, so he had better watch the flames.

He got down to the second level and cut the cable with bolt cutters. Flames were literally running up the timber struts on two sides of the tower, but hadn't reached into the middle where the stairs were. He scrambled back up and attacked the nylon rope with cutters and then the knife. Back on the verandah the flames were below him as he snipped at wire, and he left them behind as he raced to the next level and chopped and hacked at the plastic rope he had painstakingly made.

As he cut the rag ropes on the level above that the whole tower swayed and Tansis screamed, expecting it to fall to the ground. It remained upright leaning on the ship, but it moved again as he practically fell down the steps towards the air-lock. The air-lock platform was surrounded by flames, and he noticed little spurts of white smoke puffing through the mat on the floor as he leapt across to the air-lock and fell through.

He closed the lock and sagged against the wall, and then remembered that the emergency was far from finished. He got through the air-lock into the lounge, and from the communicator there he ordered immediate lift-off without return. He sat on the floor as the ship wobbled upwards and then straightened into a steady motion.

'LANDING IN ONE MINUTE AND 2 SECONDS,' flashed on the lounge screen. Tansis got up and climbed wearily to the command cabin.

'Give me manual control on landing,' he ordered, and then looked back at where they had been. A tall column of smoke was rising into the air but he couldn't see the tower – it must have fallen on its side. The scene of disaster

dwindled rapidly, and he had to turn away to look at their destination.

The ship was now falling towards the bay. The sea seemed slightly puckered and rippled from this height, but he could see a line of white where it met the shore. It must be still as rough as ever. Then the ship altered its angle and began to fall directly down to the dun-coloured spur which curved out into the sea. He took over control and chose a spot halfway along the spur where the ridge which ran down its middle rose to a small hill about eighty feet high and then sloped gently away to sea level. He should be safe from big waves there, and as far as he could get from ribbon cover. Here at last was the ship's final resting place.

CHAPTER NINE

He sat for a few minutes enjoying the view. Looking across the rough water of the bay he could see a jumble of rocks on the further shore and steep dark slopes above it looking like cliffs from this vantage point. Above the slopes, and soaring into the sky, was the great, perfectly cone-shaped mountain, the first time he had ever seen it properly and in its entirety. It seemed dark against the glaring sky behind it, with an almost black cap on its top. To think he had climbed right up there and down again in a day. It was out of the question now, for he would have a ten-mile hike before he even reached the foot.

He remembered that he had a lot to do. He went through the air-lock and felt a pang of loss. There was no tower now, no wide platform to step on to. The ship was bare without it. That tower had made more difference than he had realized; it had made a landing-place into a home, somewhere that he had changed and on which he had put the stamp of his personality.

He descended to the ground on the lift and walked round the ship looking for damage. The brilliant white and orange paintwork on one side had been blackened and spoiled by the fire, which, from the marks, must have nearly reached the top of the tower before the ship got away. It had been a close thing.

He squinted up at the platform. It was still there, and seemed to be level and undamaged. How the hell was he going to get up to it, and, even more, how was he going to haul seven generators and wind vanes up there at a half a hundredweight apiece? He contemplated seventy feet of smooth stainless steel hull with gloom. No rope left, no way of making another tower, and timber was now miles away, anyway; and to top it all he had lost his long length of power cable for outside work. He squinted up again to check that the lead from the master power point to the platform was still intact. Thank the Lord, it was. It had been outside the area which the flames had scorched.

Baffled by the problem, he turned away and wandered along the little peninsula towards its end. He could hear the sighing roar of the sea and the rattle of stones under the waves. There would always be a background of noise now – human beings seemed to need it to keep sane. Earth must have been a noisy world. This one was dead silent, and that was what made it so unsettling and depressing. Humanity could never colonize this place even though it looked green and the atmosphere was breathable. Agriculture, for example, was totally out of the question, for nothing from Earth could compete with ribbon cover. About the best way would be to live in fleets of boats moored off the shore, breathing the clean sea air. The land was dead and sterile for man or any animal, even the ones of this world.

He looked out over the bay, wondering if the sea creatures were there, and then suddenly caught sight of a dozen of them slowly swimming along about a hundred feet out. He waved, and they turned round to face him. If they had a sign language of body movements, in the same way as human beings supplemented their speech with gestures and facial expressions, how was he going to copy it? They swam in water, he stood on land, and their bodies were totally different. Perhaps they could work out a language of analogues.

He came down to the water's edge and waited for them to come closer. They approached to within about sixty feet of him and remained in a line facing him. One of them swam along in front of the others, turning quickly round in the water half a dozen times, and then joined the rest. They continued to watch him. Tansis looked at the water; it was very shallow here, and probably he could wade out a long way before he was out of his depth. That must be why they weren't coming in closer. They didn't like shallow water – it must be perilous for them with the risk of being beached and helpless.

On impulse he waded out into the water, bracing himself as waves bumped against his knees and thighs. Fifteen feet from the aliens, he stopped, feeling that strange buoyancy of the sea which kept lifting him on tiptoe and rocking him back and forth as waves passed him.

From here he could see their eyes, and he suddenly remembered the trance he had fallen into the last time. He mustn't let that happen out here in the water. He put his arms together in front of him and splashed the water up and down. Two or three of the aliens flicked their tails up and down and splashed the water too. Well, that was another gesture they had in common; the trick now was to attach a useful meaning to it.

A bigger wave than usual suddenly rose and rose in front of his face and passed practically over his head. His feet left the bottom and he floated backward, his feet coming up and his head going down. Panicking, he twisted round to see where he was falling, and then found himself floundering on all fours in shallow water. He splashed awkwardly back to the shore, discovering as he did so how impossible it is to walk through water in a hurry. His legs felt strangely weak and leaden as he staggered on to firm ground. The sea creatures were still watching him – what they made of his antics he couldn't imagine.

He decided to carry on with his walk down to the end of the little peninsula. It was devoid of any distinguishing features – just a flat expanse of sand and small stones. From the smoothness and the ripple marks in the sand, it looked as if the sea sometimes came all over it. He looked back at the ship perched on top of the little hill. It seemed reassuringly high up, but he would have to see how far up the slopes the waters came.

He reached the end of the sand spit where sand and water mingled in pools and rivulets, and waved again to the creatures still pacing him but now a lot further out. He twirled round and round, to tell them he was going back, and then turned to walk along the seaward side of the peninsula towards the ship. He looked back to see if they were following him, but they were invisible. Didn't they like leaving the bay, or did they take his gesture of twirling round to mean goodbye?

Anyway, he had a lot to do and he could always meet them again whenever he liked.

He had to think of some way of getting the generators back on the platform. He thought of rigging up a pulley or

winch and hauling them up, and then groaned in exasperation – he had no rope left. It would have to be ladders, and that meant cutting timber and hauling it for miles and miles.

Then he remembered the narrow, lightweight metal ladders for use on expeditions. There were five of them, and each was twenty feet long when fully extended. He would only need to struggle up them once with the generators – that is, provided that he could fix the ladders end to end to the top.

He walked up the gentle slope towards the ship, one half of his mind watching the ground to see where signs of flooding ended and the other half worrying about the ladders. He couldn't be certain where the sea-smoothed sand changed to ordinary desert, but it was a long way from the ship. He wouldn't need to move it again.

Sixty feet of ladders lashed together was altogether too rickety, and would get blown down by the winds. He stood at the foot of the ship looking at the tall smooth sides. Could he stick them on? Weld them on! That was the answer – weld them up the side from the ground to the top. That ought to have been part of the ship's design anyway. How could inspection and repair of the hull have been carried out when the ship was on a planet?

Greatly relieved, and cheered by yet another victory over his problems, he went inside and searched through the stores for welding equipment and ladders. He had done welding in space, as one of the external crew, so for once he didn't need yet another course of study. It was only early afternoon, and he was keen to start work on his new idea. The ladders needed to stand away from the side of the ship by at least six inches so as to give toe-room when he was climbing up them.

The first job, therefore, was to cut six-inch lengths of steel bar and weld them on to the ladders at right angles to their length, and then weld these metal bars to the hull. That brought him up against his first difficulty. Welding should not be done inside a space ship because it burns up oxygen and pollutes the air system with fumes of metal which the purifying system can't eliminate efficiently. His last job of

welding had been done on the platform outside the air-lock, but now he had no tower and no cable and he couldn't even do it at the foot of the ship.

In the end, he decided not to work inside and risk spoiling the air, so he set up his bench in the outer air-lock. The first part of the job was easy. With a laser cutter he chopped off forty lengths of steel, each six inches long. That used up all the spare steel in the emergency repair stock.

The next part was exasperating and took him the rest of the afternoon and most of the next day. He had to weld the steel joints on to the ladders within the narrow confines of the outer air-lock. With the door open, the ladder stuck out so far into the open that he had to tie it down to stop it from falling out. He welded joints on every three feet on each side of four ladders. The two at the end of the ladder were easy. The next two further along the ladder he could fix on while standing in the door with one foot on the lift. The two beyond that he could only manage after lashing panels sticking sideways out from the lift platform so that he could stand precariously nine feet beyond the inside door of the air-lock. Then he turned the ladder round and repeated the performance from the other end.

He did this with four ladders and stacked them at the foot of the ship. Welding them on to the hull, especially when he got above the range of the lift, was going to be a big and strenuous performance, and he left it to the next day.

He spent the rest of the afternoon and evening studying the film he had taken of the alien's face and eye movements. He ran it in slow motion again and again and could see that there was a pattern to it, but he couldn't see what he could do with it. He gave it to the computer to analyse, and the machine chewed on it for half an hour and delivered a mathematical analysis that left Tansis no wiser. He was good at the mathematics of celestial mechanics and navigation, but knew nothing of the rarefied mathematics of ciphers and codes.

The flickerings of the left pupil were a rapid repetition of the dilation of the right one, identical in pattern but varying in frequency. It was as if two human beings uttered exactly the same sound, one quickly and one slowly, the variation

and the pauses in between forming the meaning. It was hopelessly beyond human capacity to cope, and too fast to understand.

The computer could discern groups of movements, and some of these groups were used more than once in the film; but what this meant Tansis couldn't understand. When he asked the computer this plain question, the answer was so involved and qualified that he gave up. He couldn't see how he could ever talk to them as he could talk to his own kind. With patience and time he could perhaps build up a small vocabulary of signs with limited meanings, and that would be about all.

For the whole of the next two days he sweated at welding the ladders to the hull. He began on the ground, using an electric arc welder powered from a portable generator. To start with, he had to get the first ladder to stay vertical while he welded the first joints to the hull. Trying to weld with one hand while he held a twenty-foot ladder upright and steady with the other was beyond him. He solved it by tying magnets on the ladder and clamping them on to the steel sides of the ship. They were strong enough to hold the ladder in place, but they couldn't take his weight as well.

He was able to weld the first two pairs of joints while standing on the ground. To do those higher up he stood on the ship's lift and shifted upwards. The ladder ended ten feet below the air-lock. He clamped a second ladder above the first and then welded the ends of the two ladders together and then the joints one by one. When he got above the ship's lift he stood on another ladder resting on the lift and propped against the hull. He took his portable generator up with him and hung it on the ladder. There was a power point on the maser transmitter further up, but he couldn't reach it until the ladder was finished. He clamped a third ladder to the hull and welded it to the top of the second ladder. He welded up the joints on that one while standing on it. He was risking his neck, but he had no choice.

This brought him past the shoulder of the ship where the hull began to slope in to the nose-cone. The platform jutted out thirteen feet above him. Getting the last ladder into position was the most dangerous and exhausting part. He

fastened a sharp hook on to the end of it and then lifted the ladder up and waved it about his head until the hook caught on the platform edge. He had taken the precaution of tying himself to the ladder he was standing on, and was glad he had, for twice he had slipped in his brace and dropped the ladder before he had finally caught the platform. Then he welded the two ladders together and threaded flexible plastic piping through the rungs of both to help bind them together, and last of all climbed gingerly up the platform and secured the ladder with big, rough, home-made spikes which he had carved from steel with the laser.

He could never feel the pride and satisfaction over this ladder that he had had for the tower. He wasn't sure that it would last long – it looked and felt like an awkward, bodged-up, temporary measure; but as long as it enabled him to get the generators back on the platform it would do.

He carried up and secured three generators before the end of the day, and the next day fixed up the remainder, connected them to the power cable from the maser and checked them out. The wind was strong and steady, and enough power was coming through to run the ship.

With the power system back in operation he felt secure, and hoped that in this final resting-place he could cope with life on this world. It was now mid-winter with temperatures five degrees above freezing and strong winds from the north and east. The high tilt of the axis gave this world a more extreme climate than Earth. This island was roughly equivalent to the Canary Islands for latitude and proximity to a great desert, but it lay in a very cold current. By now the northern snowcap probably extended down to the middle of the great river basin, but he would never know. He was thankful he was no longer on the continent.

As the weeks passed he settled into a new routine. Each day at midday he walked along the shore and met one or more of the sea creatures. Sometimes he walked round to the long stone outcrop and sat at the end of it trying to fashion a simple language of signs. At first he avoided being drawn into telepathic contact, and didn't gaze too deeply or

too long into their eyes. He found that telepathic rapport only happened when a dozen or more of them tried to contact him together.

Occasionally he would walk right round the bay to the opposite point, but he never bothered going inland and never went near the trees or the ribbon cover. The aliens quickly learned his habits, and at least one would be waiting for him at the same spot opposite the ship at midday. He checked their timing, and found they understood midday precisely. For an experiment, he altered his time for a couple of weeks and went for his walk at exactly mid-afternoon; and after a couple of days they appeared at that precise time also. Their sense of time was obviously very good, perhaps natural in a species whose language involved responding to a visual signal.

His stock of earthly foods had now run out, and he lived on processed algae from the air purification tanks, supplementing it with sea plants suitably processed, and occasionally from the flat crawling jelly-fish. As far as he could make out the sea creatures ate sea-plants, or at least that was all he ever saw them eat. They foraged along the rocks like grazing cows.

He saw no sign of material artifacts, nor did they use any kind of tool, and he saw nothing of any nests or hollows in the rocks, or any place in the waters of the bay where they might live. Materially they lived at an animal level, yet Tansis had no doubt that they were not only intelligent but civilized as well. Together they agreed on gestures or movements – 'I am going now', 'I am going left', 'I am going right', 'I am hungry'. As regards the last gesture, Tansis had eventually got into the habit of taking his helmet off for at least part of the walk, although he used to check the wind direction first, and only breathed the air when it was coming in off the sea. Eventually he took food with him and ate it picnic fashion while he conversed with his friends. Then they too would eat. Once he gathered sea-plants and, leaning out from the rock, offered them to the aliens. None would touch his hand, but they carefully examined what he had given, and then each of them ate one leaf. As each one finished it waved its tail slowly from side to side.

Daily contact and converse with them settled him. He no longer suffered from the terrible black moods and the stress which made him see the dead members of the crew everywhere in the ship, though he still continued to chatter to himself, and sometimes to his ghostly mother and sister.

He used the computer a lot because that too gave him company. He did a lot of reading, and continued to study medicine. He would have to be his own doctor, and new hazards to his health could happen at any time.

Wind was plentiful on the peninsula, and the power supply was now assured for most of his lifetime, provided that the generators didn't break down or something in the ship fail.

The spring equinox came, and with it a warning sign – the first major malfunction in that superbly made ship which had functioned faultlessly for over two earthly years.

The pump which circulated the air through the ship broke down. With access to all the plans and the knowledge of the computer at his disposal, he tinkered it back to life again, but he understood the danger. Nothing so complex as that ship, built by imperfect human hands, could run without trouble for year after year. He would need to be his ship's engineer as well as his own doctor. These were now his principal duties, and he could never know too much about either.

From then on he divided his day, studying medicine in the morning and the plans and mechanisms of the ship in the afternoon. In the evenings he did what he pleased. With a nap in the late afternoon he had now become used to a twenty-two-hour working day and ten hours of sleep. In fact, he came to regard the long Capellan day as a good thing into which he could cram so many things and still sleep well.

The island climate started to warm up again, and the dark cap of vegetation of the mountain changed colour in a subtle way. Intrigued, and even a little anxious to know what his adversary the ribbon cover was up to, he made an expedition to the band of cover eight miles away. On the way he took a close look at the hour-glass trees. He was ex-

pecting to see signs of fresh growth of the foliage, but there was none. That was another eerie thing about this world; there was abundant life but no sign of growth or renewal. No dead or fading vegetation, no young shoots or half-grown trees. Every tree was mature, all the same size, all identical. It seemed as if ribbon cover, in its many forms, had covered the world long ago, and had then simply remained, never dying, unable to spread further. a status quo that might have been existing for millions of years. Yet there were renewal mechanisms, for the immense output of pollen each autumn was an analogue to reproduction, counteracting the inevitable tendency to genetic drift and disorder.

What Tansis did find in the foliage ribbons of the trees was a thin yellow band along the centre of the ribbon which had not been there earlier. When he reached the ribbon cover he found a greenish yellow strip running along the centre of them too.

This, then, was the way the vegetation renewed itself each year, not by growing bigger but by some internal reorganization or renewal of cells within the ribbons. He took samples of ribbon and root and of the air close to the ribbons, to analyse later.

While he was in the interior he seized the opportunity to prospect for water, using the dowsing rod. Tracking along the foot of the mountain towards the western shore, he found one promising spot and marked it with a cairn of stones. He would have to come back and drill a well, for the fixed water supply in the ship needed topping up.

Spring passed into summer, and the external temperature rose. Not that it made any difference to him when he was in the ship, for he could set the ship's temperature how he liked; but when he was outside it was now pleasant to take his helmet off and breathe the warm, fresh air off the sea. His nose was still a bit runny and he always brought up mucous when he coughed, but he had got used to that as a minor occupational hazard of living on Capella Six.

He drilled his well, which involved a week of hard work hauling the rig, in pieces, to the cairn eight miles away, and brought back several tankfuls of water which he purified.

He also built a level platform of stones at the end of the rocky outcrop, with a waist-high wall around it, so that he didn't feel so exposed and needn't be afraid of slipping in the water.

The ship's lift failed, and when he examined it he found that parts were clogged by windblown sand and corroded by the salt air. Though he managed to fix it up, he knew its functional life was limited, and that he would have to use the ladder eventually.

Having no long power leads was a great nuisance, for he needed to be able to use tools outside. He cannibalized all the equipment he didn't need and pinched bits of cable and flex from here and there, spliced it together and got a length of forty feet – just enough to enable him to work at the foot of the ship. It was then possible to set up a work place on the ground. He collected flat stones, paved the ground below the air-lock, and built a wall around it, and stored a bench and tools in a tent set up inside the wall. He spent a lot of time pottering about in this little courtyard, and one hot and windless day, working without his helmet in the shade of the ship, he took his suit off altogether and for the first time stood in this world unprotected except for the thin white trousers and tunic which he normally wore inside.

He found it so pleasant that from then on, provided that the wind was in the right direction, he worked and even went for walks along the shore unprotected.

Looming up and overshadowing all else was the imminent end of the insulation film. Tansis realized that he hadn't timed it right. He should have gone easy on his use of it. He had used it liberally since he came to this bay – indeed, he was living out of doors most of the day now.

He ought to stop using the film and simply walk in and out when the wind was from the sea and the computer's continuous air sampling was indicating no danger. He had kept putting it off and putting it off because it seemed such an irrevocable step. So far all he suffered from was a sort of chronic cold which never got better but never got worse; but once he switched off that flowing sheet of plastic film then dust and micro-organisms would begin accumulating in the ship's air system and there was no knowing what the

long-term effect would be. He would no longer have a bubble of earthly environment to rest and sleep in. Slowly but inexorably that bubble would become the same as the outside; and could he live long in continuous exposure to alien substances in the air?

He had no choice. In the end he would have to live in it. He waited for a particularly favourable day, a gentle wind from the west, and did the deed. He didn't need to alter the rest of the air-lock operations, for the inner doors closed before the outer ones would open, and the outer lock was evacuated of air on each pass and new air brought in through the purifiers. There was no shortage of power to operate all this but only a lack of film, and the pollution of the ship's air would be very gradual, but it would be irreversible once it began.

Once he had switched the insulation system off the burden seemed to lift from his mind, and he didn't bother to switch it on again.

After his initial period of progress with the aliens, the relationship with them slackened. He no longer met all twenty-two together. Only one or two would be waiting for him each day, and they made no attempt to engage him in telepathic contact. He was both disappointed and relieved, for deep down he feared a loss of control over his own personality, yet he wanted their company. It became harder and harder to think of new things to do with them, and he worried in case he was becoming boring to them.

Were the few that kept on seeing him in the same ones, or were they taking turns? He still couldn't distinguish individuals. Were they just the village idlers wasting time with him, or were they the most curious and intelligent engaged in a close study of him? They could even be visitors from elsewhere who kept dropping in and were brought along to see this strange creature above the waves. He speculated and worried, but came to no conclusion.

The weeks and the months passed, and now the pollen season was drawing near, and a time of enforced confinement to the ship. He watched the air analysis carefully, looking for advance signs of the approaching deluge.

When it came it was sudden. The previous day had been like any other, with a low dust count and a slight wind from the south. The next morning the computer was showing an enormous pollen count on the screen, and the yellowish haze on the mountain and all over the sky was plain to see.

For once Tansis was not caught unprepared. He had laid in stocks of processed sea food, the water tanks were topped up, and the wind generators had all been overhauled. For the next six to eight weeks he would have to wear a suit and use insulation film if he had to go out, and, since the insulation film was strictly rationed, only a breakdown of the generators would force him to do so. Once the pollen season was over the insulation would be switched off permanently till this time next year.

During the summer months he had been spending so much time out of doors that the housekeeping of the ship had been neglected. He embarked on a spring-clean and a general tidy-up. He also began a systematic repair and maintenance check of everything, and resumed his morning study of medicine and the afternoon study of the ship's plans and maintenance manuals.

The storm of pollen went through the cycle of the previous year, the same cycle that had probably been repeated millions of times before. First a sudden massive increase, doubling every day for a week until the mountain couldn't be seen and the sea ended in yellow fog, then a gradual drop followed by a small peak, another massive increase from temperate latitudes, and a final burst as the arctic regions made their contribution.

The world closed in around the ship, yellow and menacing. At its worst Tansis couldn't see the far side of the bay. He wondered how the sea creatures fared in it. Were they adapted to it or did they leave for deep water? He studied the usual meeting place through binoculars, but saw no sign of them.

He was anxious and uneasy, and his loneliness and stress returned. He found himself arguing with the medical officer again, and couldn't pass the commander's cabin without having to make a deliberate effort to pull himself to-

gether. He worried in case the sea creatures never bothered to return. He worried in case the generators broke down, in case pollen somehow got into the ship. His congestion got worse, and so did his cough. How flimsy his mental defences were, how easily the old enemy returned when anything went wrong.

Slowly the pollen count went down and then, suddenly, it was gone. He kept up his precautions for another couple of weeks, then switched off the insulation system for another long Capellan year. It was another month before he could bring himself to take his helmet off when he was outside.

Looking back later, Tansis realized that the pollen storm was the turning point in his life on this planet. It forced him to come to a permanent decision about the insulation. It was the last unknown danger of the Capellan year. After it was over he was able to settle into a life which could cope with this world. He had found the safest place to live, solved his energy problem, had enough to eat even if it wasn't very appetizing, could breathe the air, and had established that there were no bacteria that would harm him. He knew what the dangers were and could avoid them, and he had established contact with intelligent creatures.

He could now relax instead of facing one crisis after another, and after a while he became bored and the long long vista of years and years on this island depressed him. What else could he do? He couldn't start a farm or raise a family, he seemed to have come to a dead end with the aliens, and he couldn't just spend his life studying medicine and ship's plans and doing the house-keeping of the ship. He couldn't think of anything else to build, and there was nowhere to go. He had seen all the films on the ship, listened to endless music tapes, and read all the books that interested him. Now that there was a quiet time of routine without troubles and dangers he felt the absence of human companionship, of someone to talk to, of a woman to love, of children.

There were times when he just didn't know what to do and didn't care to do anything, whether it was work or recreation

or a hobby or going for a walk. Everything seemed as dull as ashes. He would sit or pace about gripped in a deadly lassitude of boredom. He became careless, didn't bother to eat regularly, went without washing. He found the computer boring, and allowed days to pass without bothering to see the aliens, who had turned up in the bay two weeks after the pollen season was over.

For a while he took up stone-throwing as a pastime. He would build a cairn of stones on the beach and spend hours throwing stones at it to improve his aim. Then he got bored with that. He took up painting, but after several weeks his enthusiasm faded. He tried writing an account of his life, but gave up because there was no one to read it. He not only talked to himself and had rows with imaginary crew members, but he began to develop all kinds of eccentric habits. He couldn't go to sleep unless his clothes were arranged in a certain pattern around his bunk. He could only eat in one particular seat in the assembly lounge. He would fly into a rage with the computer for selecting a piece of music he didn't like, and his dislikes became more intense and numerous as the months wore on. He would type great streams of abuse and insult to the computer, which neither knew nor cared that Tansis was hating it.

Driven by boredom and restlessness, and with a part of him no longer caring whether he lived or died, he went off on expeditions again. He visited his former landing-place and found nothing but a few faint traces of ash in the dust. The tower had vanished completely. When something burned in this world it really burned, and the ashes had been carried off by the wind. The tank under the ribbon cover was dry, the water evaporated by the summer heat.

He got the idea into his head that he had to get to know this island thoroughly, so for a while he tried to visit every hour-glass tree in the southern part of the island. He went for walks every day to increase the number of trees he had bagged, like some collector who had to have a full set of his chosen rarity.

He became more and more obsessed with the mountain. It soared majestically into the sky, beautiful in shape and always changing in the light. Clouds gathered round its top

and mists moved down its side. Sometimes it had a great pennant of cloud blowing away from its summit, at other times a cloud just stood above it motionless. The mountain had fascinated him ever since he came to the bay, and it was the first thing he looked at in the mornings when he went to the command cabin to see what was on the screen and to give the computer any orders for the day.

At first he had reconciled himself to never going up it again because of the distance, but later he began to wish he could go, and then it was only a small step to wondering when he would go. He made his preparations very thoroughly. In two hikes he took a tent, a generator and an air-purifier to a point a thousand feet up the slope beyond the ribbon cover. On his third hike he took another tent, spare air-tanks and insulation spray-cans, and spent the night in the tent on the lower slope of the mountain. The next day he climbed to within a thousand feet of the vegetation on the top and set up a third tent with charged air-tanks and the spray-cans.

It was only just after midday when he finished setting up his second camp, and after a meal and a rest he climbed to the vegetation and wandered about in it for the rest of the afternoon. He was extremely careful with the spray-cans and coated himself liberally over and over to make sure he left no pinholes of entry for ribbon cover scent. He slept that night in the tent, nearly seven thousand feet up the mountain, with the whole of the next day in which to reach the top. This was the greatest aim of his life now. When he had done that the island would be his; he would have conquered it, and it would have no secrets left.

Starting early he climbed to the tree-line and walked upwards through the trees. As he went higher the peculiar ribbon logs became more frequent until the last thousand feet, when the slope grew much steeper as he began to climb the actual lip of the crater of the ancient volcano. Here, on slopes so steep he found it easier to go on all fours, the logs almost covered the ground. This made it a bit easier for him, for they acted like great steps lying this way and that over which he could scramble. Trees and logs grew thickly right up to the rim.

When he reached it he found himself on a razor-edged ridge which enclosed a vast, deep crater half-full of water, with densely wooded slopes falling down steeply to the bottom. This hidden lake was the last secret of the island, five hundred feet below him, black and utterly still, framed by thick woods.

Wisps of cloud floated across the crater, forming and breaking up rapidly as a strong wind blew them about. Cloud seemed to be no more than a hundred feet above his head, and it cast shadows across the scene, an unusual thing on this world. A mass of grey mist came sailing straight towards him from the opposite rim. Irrationally he ducked as it seemed to skim just over his head, surrounding him with mist for a few minutes. The scene was both beautiful and disquieting, so still and silent down below, so full of movement and shadows above. The pilot in him wondered where he could have landed the ship if he had managed to get it up here.

He stood, undecided whether to go down into the crater, and then decided to in case this was the last time he would ever see it. The thick growth of logs helped him, and he made it by sliding, and sitting when he wanted to slow himself down.

By the water there was a band of slime ribbon just like everywhere else. The lake seemed very big when he stood at its edge, utterly still and dead black, the crater walls towering about him and making him feel small and insignificant. There was no wind down here, and the silence was total.

He spent several hours scrambling round the lake shore looking for rocks. He was hoping to find sulphur, which was one of the elements he needed most for food conversion. Very little rock was to be seen, for the ribbon cover flourished exceedingly and covered everything. He found some greenish-black hard rock and took a sample, as well as a flaskful of the lake water to analyse, and found nothing in the vegetation he hadn't seen before.

He spent another night in the tent just below the vegetation – he would never camp in that stuff again – and next morning decided to leave the tent there for any future

forays. He reached the lower camp three hours later, still fresh and fit. He left this camp too as it was, and after recharging his tanks pushed on and reached the ship in the late afternoon.

With careful preparation, and knowing the dangers to avoid, he felt confident that he could now go on expeditions without having any more disasters.

The rock sample, he discovered, was olivine, a volcanic rock and of no use to him, but the lake water contained sulphur. Getting a tankful of lake water down from the mountain and extracting the sulphur from it would be a cumbersome and time-consuming way of getting an ounce or two of sulphur. However, he might have to do it some time, and it was nice to know it could be obtained.

It was well into autumn, three and a half earthly years since he landed on this planet, and life was now a safe, steady plod with the years stretching endlessly in front.

One day, feeling close to despair with the gnawing loneliness and ennui, sick of the sound of his own chattering and worried that he was going to go mad, he resolved to get into telepathic contact with the sea creatures again. He had been neglecting them recently, and he was afraid they might have stopped caring. He hadn't been for his usual walk for weeks, and he no longer saw any of them waiting for him.

He walked round the bay and down the long jutting rock, and stood inside the walls he had built out of big flat stones. He fired a signal rocket and waited. After ten anxious minutes two of them appeared and lay a few feet away watching him. They always seemed to wait for him to make the first gesture, he reflected – perhaps a telepathic species didn't need gestures of greeting and the rest of the formalities that human beings needed when they met. Using the few gestures through which he had established at any rate a minimum of communication, he bowed and they ducked and flipped round. He signed for them to come closer, until they were standing just below him in the water with their heads well above the waves and their eyes fixed upon his. Then one of them went off while the other stayed, falling

back to several yards away and moving slowly back and forth. Tansis had never worked out why they did this, unless it was meant as a 'Don't worry, I am friendly' gesture which could have been instinctive.

During the next half-hour others arrived in ones and twos until there were seventeen of them, slowly moving back and forth in a semi-circle. Then another one came up to join them, and as one they ducked and slipped round. Tansis wondered what had happened to the other four. Were they too busy, or dead, or gone away from the bay? He would never know. There were a lot of things he didn't know. For instance, how did he never see young sea creatures? They surely had children and half-grown adults. Did they have male and female? He wished he knew, for all the aliens he had seen looked alike with very minor differences.

He gazed at them and they gazed back. After a minute or so they enlarged their eye pupils and he looked deep into the eyes of one of them. A few minutes passed and he felt the strange sensation of falling into them and of the unreality of his surroundings. He leaned against the rough stones of the wall and clutched them as he continued to fall into the strange eyes in front of him. He saw himself as if from outside, up there where the world ended in light, shining and mysterious. He felt their curiosity and friendliness – and something else, tender and . . . But as he tried to grasp it they withdrew it. He searched round, trying to see them as they saw themselves, and found a oneness, one with another and with all things. It was a mystical feeling of unity and a sense of the Divine. These beings were deeply religious in their whole feeling for life. He reached out to enjoy their presence and friendliness, they trusted him although they found him strange and anomalous, an irruption of the unknown into their familiar and known world. Their awareness and feeling for him was tinged with something that troubled them, and again he sought for it. They . . . pitied him. It was pity. Why?

They recognized his surprise and drew back, breaking off the contact, and he found himself back on the rock with the sea and wind sighing and rushing about him.

What did they see within him that caused them to pity him? Had they understood his previous attempts to picture his story to them mentally, or did they see some intimation of disaster?

The aliens ducked and turned to move away. Perhaps they were embarrassed because he had found the way they felt. Anyway, it was getting late and he would have to get back. Hours and hours had just disappeared without trace.

He felt relaxed and happier, as he always did after contacting them, but he was troubled. Troubled more deeply than he knew. They pitied him ... and deep down it didn't really surprise him.

He walked down to the rock every day after that and resumed contact with them, but they didn't come in such numbers again. Usually he met one or two, sometimes half a dozen, and telepathic contact was weaker and more fitful, but he needed to see them – indeed, he found he couldn't manage without them, and unfailingly they were friendly and patient and courteous. He realized that he couldn't expect all of them to meet him every day. They had their own affairs to attend to, and couldn't spend all their time with him, but he came to understand that they were not bored or indifferent and were always there, and this was a great consolation.

It was winter now, and he no longer took his helmet off when he was by the sea. It never froze on this oceanic island, but the sea wind was wet and cold, and he was too used to the constant warmth of ship's life to stand it without suffering recurrent chills.

He reached a new level of stability in his routine and his psychological state; his depression lifted a bit, and the imaginary enemies within the ship appeared less frequently. He resumed his studies yet again, cleaned up the ship, and made resolutions to eat properly, wash regularly and keep a grip on his imagination and his anger.

Mid-winter ... four earthly years, one and a half of this world's long years. He had found a niche in which he could exist, he had solved the main problems, apart from the problem of himself, and whoever solved that except by growing

into a deeper maturity? Yet at the heart of him there was a grim resignedness, and he never cared to think of the years to come. It was as if he were waiting for something.

CHAPTER TEN

As the mid-winter passed and the days grew a little longer, and on the day he noticed a bright gleam of snow on the very top of the dark cap of the mountain, it happened.

That morning he noticed a peculiar and unpleasant smell in the ship. He searched each level, followed his nose, and traced it to the algae tank. There was no doubt the stink came from there – it made him grimace and hold his breath when he removed the transparent permeable cover.

The bright green scum growing in its tank of nutrient, a living fragment of the mother world, was spotted with brown blotches. He went back to the computer and ordered it to run a check of the whole life-support system for malfunctions. The supply of nutrients, or the carbon dioxide, or maybe the temperature control was faulty. But the computer reported no malfunctions, and then unnecessarily informed him that there was an unusually high level of pollution in the air system.

Tansis went back to the tank and tried to remove the blighted areas of algae, ladling stinking brown slime into a bucket. He took the bucketful outside and buried the stuff in the sand after sprinkling it with acid. It would have been a crime against nature simply to throw it into the sea, for who knew what immense long-term results that could have caused?

The smell in the ship worsened, and each time he inspected the algae he found new patches of blight. Late that day he removed two bucketfuls of slime, and before he turned in for the night he removed yet another.

Meanwhile he consulted the computer for information on diseases affecting algae, and ran an analysis of the nutrient solution. He made microscope slides of the green and the diseased algae and photographed them through the electron microscope. He also sprinkled antibiotic into the solution on the slim chance that it might do some good. As a precaution he switched the water and air systems out of the algae and into the chemical purifiers.

He went to bed still not knowing what had gone wrong. Well before dawn he was awoken by a stifling stench and got up in alarm. The tank of algae was completely blighted and dead, and nothing but a blackish-brown slime remained.

The computer was showing a high level of pollution on its screen, but because a computer doesn't know what smells are bad and alarming it hadn't sounded a warning signal. Not that it would have been any use if it had, for the whole thing had happened so quickly and with such finality that he doubted if he could have prevented it. He searched through the tank and all its ancilliary equipment, but not a trace of living algae remained. So he couldn't purify air and water biologically, he had no terrestrial source of food left, and the organic wastes disposal system was gone.

The first thing he had to do was to flush the foul air out of the ship. The filters in the pumps could remove dust and fluff, but they couldn't remove that smell, and he didn't know if it was injurious to him.

Tansis, now dressed in suit and helmet, held counsel with the computer. It was necessary to pump out the air from the interior of the ship to the lowest pressure the pumps could manage and then draw air in from outside through filters and chemical purifiers as he did on a small scale when he charged his suit air-tanks outside. He was throwing away his bubble of earthly air, the little piece of Earth that had been carried across sixty-five light years of space to Capella, but there was no alternative. The smell was intolerable and might be poisoning him, and had to be cast out.

Before the air pressure could be reduced to near-vacuum, many precautions and safety measures had to be taken all over the ship. The computer gave a list of valves to be turned off, seals to be applied, covers to be clamped down and systems to be turned off. Part of these measures would be done by the computer, and the rest manually by himself.

It was midday before the preliminaries were finished and Tansis ordered the pumping out to start. This was a task the pumps were not designed to do, for although a small amount of venting was allowed for the ship's design full

removal of the air was unthinkable. It was four hours before the computer notified him that the pumping limit had been reached. All that time Tansis had remained in the command seat watching the screens as the computer monitored the systems of the ship.

Then the recharging of the ship's air began and took another four hours of anxious waiting and watching. When it was finished he broke the seal on his helmet and took a sniff. It was clean but very cold, for the ship hadn't had time to warm it up. It was odd to feel cold inside the ship.

Next he brought the ship's systems back to full operation and removed the seals and other precautions. Finally he ran an analysis of the water. There were three thousand gallons in a closed recycling system which normally used the algae bed to cleanse and oxygenate itself. For several hours the previous day it had been passing through the diseased algae – was it infected? It didn't smell, the tests showed nothing wrong and it tasted all right. It was just as well. It would have been impossible to remove it except by hand, and to replace three thousand gallons when the nearest source of water was eight miles away and every gallon had to be purified first didn't bear thinking about. As for his own body waste, he would have to remove it from the ship and bury it every few days.

The world was determined to make him go native. From now on he would be breathing nothing but Capellan air and eating Capellan food. No more safe nutritious sludge from earthly algae. From now on he must forage for sea food along with the sea creatures, and spend time processing everything he ate. He was going to need sulphur from the lake eventually, and expeditions to the mountain summit would become a necessity. The problems were not insuperable, but it was all another lurch downhill, a still deeper level of shipwreck. This world was relentlessly beating out his little bubble of earthly environment.

There was at least one bit of cold comfort. The air now was cleaner than it had been for months. Some alien dust and molecules would still be inside adhering to surfaces, but he would be starting with fresh purified air and it would be a good idea to change the air every few weeks. Now that he

had done the unthinkable, he had nothing to lose except Capellan air.

He studied the electron photographs of the algae cells that were now the only evidence of what happened. After hours of study and consulting with the computer, he could only conclude that the algae cells had become cancerous – at least, the disorder in their cells could be construed as cancer, and what could have caused such an unheard-of thing except the alien molecules that had seeped into the ship and been passed through the algae over and over again as the closed life-support system pumped them round? And he himself ... were they cancer agents for him?

Algae are simpler by far than human beings, and their generations enormously shorter. If the effect was a long-term one then he was safe, for there would be no generations after him. On the other hand, a human being is more delicately balanced and intricate, and he can certainly suffer from cancer.

Tansis could come to no conclusion, and put it all aside. He would die one day, no doubt about that; he didn't want to know what day.

He was never the same after that disaster. A certain light-hearted resilience, a playfulness, left him. He became more serious and smiled and laughed less within himself. He lived like a man condemned, and waiting.

He eventually settled into another routine, one which he did with a grim determination and a strict schedule of duties. There was food to collect and process, the disposal of waste, the cleaning of filters and the recharging of chemical purifiers. Each month he changed the air of the ship. More and more things began to go wrong, valves clogged, parts failed in machines, circuits had to be tested out and put right. The lift failed for good, and everything now had to be carried up and down the ladder. Two of the wind generators gave persistent trouble. The morning visit to the computer for the latest news was no longer a minor but pleasant event. He dreaded what new bother the screen would be showing.

When spring arrived, he could no longer put off the ex-

pedition to the mountain for sulphur. This time it was not an adventure but another drudgery. He wasn't exploring, just hauling water the hard way.

He made thorough preparations, and stocked both camps first in four preliminary hikes. Finally he started out from the ship with the big powered trolley, which he had brought back into service by using the bearings from the two troublesome generators. He rode on it over to the well and left it there. He then put one empty water tank on his back and the other in the hand-trolley, and climbed to the first camp. After a meal and a rest and a recharge of air he climbed on to the high camp.

There he spent the night, and then climbed straight to the lip of the crater. It took him a lot longer than he expected, for the last thousand feet, very steep and strewn with logs, was like an obstacle race now that he was burdened with two tanks and a trolley. He was so breathless and sweaty when he reached the rim that he doubted if he could possibly do it all in one day.

The worst part was yet to come. He slithered and bumped his way down to the lake, filled his tanks and sealed them. The trick was to get two full, heavy tanks back up five hundred feet of steep, wooded slope. He had to take them up one at a time, slowly, negotiating each log and hollow with a loaded top-heavy trolley that cantankerously stuck in every crevice and jammed against nearly every log. After doing this twice over he could hardly stand with fatigue, and lay exhausted on the narrow rim oblivious of the view. Only the lateness of the day forced him to get up and go on.

He abandoned the trolley and two empty air-tanks to be collected some other time and started down the slope, letting the water tanks slide down the ribbon cover and zig-zagging them between the logs. The mileage was longer but the effort far less with gravity to help him. Lower down the going got easier as the logs became less frequent, and he reached the end of the vegetation just as night was falling.

Night was never totally dark in this world, for there was always a dim glow in the sky, sometimes flickering and changing in brightness from time to time, and one could

just see to walk without being able to distinguish distant objects.

He could only get to the tent a thousand feet below by dead reckoning, and before darkness became complete he had time to tune in to the ship's maser and work out how many frequencies he would need to cross in order to reach the camp from the point he was at. The trouble was that the camp was not in line with the ship and himself – otherwise it would have been simple to home in on one frequency.

He started slowly down, dragging the heavy tanks behind him and straining his eyes for any hazards underfoot. He descended at an angle to the slope which he reckoned would bring him to the tent. As he did so he would need to count five changes of frequency on his receiver, and when he was fifty yards from the tent he ought to see it glimmering; for it was a brilliant white. He bitterly regretted not leaving a light on, but he had not foreseen what a long and difficult business it was going to be.

The tanks slid reluctantly and fitfully behind him as he went down. They naturally tended to slide straight down and not at an angle to the slope, and Tansis had to keep tugging at them and then hurriedly braking as they suddenly gathered speed.

He began to cross an area of small stones which, judging from the slope, were on the side of a shallow gulley. The tanks suddenly accelerated and he heard the rustle of stones as they gathered speed. He hauled on both of them to brake them, and they began to diverge. His feet slipped and he fell awkwardly, still trying to hold on to the tanks and stop them. He felt an excruciating pain in his back, and letting go of the tanks, fell on to his forearm. His hand slid through the stones, and he screamed as the bone in his left forearm snapped. The tanks careered downwards in a roar and rustle of stones.

For several minutes he lay there stunned by shock and pain. When he tried to get up he couldn't use his left arm, and rolling over was so agonizing in the small of his back that he had to lie on his right side for many minutes more while the pain subsided.

In great suffering he got to his feet and wobbled and

limped very, very slowly down the slope. Every movement and every breath produced pain. His back was worse than his arm, and he tried to find some way of moving that would minimize the awful pain. He had wrenched one of the big muscles, and knew that if he didn't keep moving it would stiffen up and immobilize him altogether.

All he thought about was the tent. He had to reach the tent. He kept going down and sideways, straining through the darkness for a glimmer of white. He forgot to count the frequencies on his receiver, and was no longer self-possessed enough to recognize which was which.

After a long nightmare of shuffling, terrified he might fall over and wrench his back again or land on his arm, he found the tent and, thanking God, crawled inside.

He couldn't use the spray cans, indeed he couldn't do anything except lie down gingerly and gasp in pain and relief. He removed his helmet and thought about changing his air tanks, and then he passed out.

He came to some time in the night and tried to remove his suit so that he could attend to his arm, which now beat with a steady throbbing pain and was badly swollen within the sleeve. With his back sprained he found he couldn't get the suit off, and all he could do was to take a painkiller and a sleeping tablet to knock himself out for the night, and hope for the best.

When he came round again it was day, and though his back was a bit better his arm was a steady pain, and was swollen tight within the sleeve of the suit. He took another painkiller and ate, and then limped slowly and painfully down the mountain towards the lower camp. Because he couldn't change his suit tanks he left his helmet off and hung it from his belt, but the wind was so cold at this altitude that he was forced to put it back on, leaving it loose so that he could breathe.

He passed one of the water tanks several hundred yards lower down, wedged in a hollow, and the other one, which had collided with a boulder, a bit further on. Why the hell hadn't he left them behind when night fell, and just walked down to the tent? What possessed him to struggle with two great heavy tanks down a mountain in the darkness? He

must have been stark mad. He cursed himself and his fate, his busted arm, this bloody planet, and wondered why he hadn't called it a day yesterday. Why did he always have to go on beavering away to the bitter end instead of taking it easy? He should have stopped when he was on the rim of the crater and taken a day for each stage. The tents were well stocked. What the hell was the matter with him? Now he was injured and crippled and he still had no sulphur, and when he got back to the ship, if he ever did, he couldn't stop working because he had to eat and keep the ship going.

Slowly, often in pain, resting every few yards, he picked his way down and arrived at the lower tent in the late afternoon. He crawled inside without bothering with spray-cans or the air tanks, ate and drank, and knocked himself out again with drugs. Even with a powerful sleeping pill and a painkiller he slept fitfully, dozing and dreaming and feeling pain in his arm at intervals.

His back felt easier next morning, once he had got over the initial stiffness of the night's sleep, and he limped slowly down to the trolley he had parked by the well. The worst was over, for he could ride on it back to the ship. A gust of wind brought the harsh, breath-catching smell of ribbon cover from a quarter of a mile away, and he secured his helmet and painfully and slowly connected a spare air-tank to his suit.

Two hours later he reached the ship and was never so glad to be back. It was home, the place to come back to, the place where he was safe and could rest and lick his wounds.

It took him an hour to get out of his suit and strip, and the sight of his arm shocked him. From elbow to wrist was swollen, and purple with a great bruise, and he couldn't bend his elbow or move his fingers without excruciating pain. He took an X-ray photo in the well-equipped medical cabin, and saw that both bones in his forearm were broken. The ulna had a simple break, the radius had splintered. His medical studies had been time well spent, and were meant for an emergency like this.

He tried to set the break in the bone but nearly passed out with the pain, and had to give himself a massive dose of morphine and try again, using X-ray photos to check the

results. After two or three tries he had had enough, and after injecting himself with antibiotics and various drugs to accelerate healing and reduce inflammation he bound his arm with a splint and bandages, put it in a sling and went to bed.

He spent a week in the ship recovering from his ordeal. His back was nearly back to normal, and the inflammation and swelling in his arm went down and with it the pain, but he hadn't been able to set the bones properly, especially the splintered radius, and evidently he had damaged the nerves, because he couldn't close his fist and he had no feeling in two fingers. So he had a permanently crippled arm and hand to add to his problems, and these were now getting serious.

What was he going to eat if he couldn't process sea-plants properly? He was running out of the chemicals he needed. Sulphur was the most urgent, which was why he had gone up the mountain, but even if he had been successful, instead of being a bloody fool up there, it would only have been an ounce or two, and another expedition would have been necessary in six weeks' time. And besides sulphur he needed fluorine and potassium and iodine. There were also one or two metals, but he could get those from the ship. The other things he used were either catalysts which didn't need replacement, or else substances he could recover from the residue after processing.

The chemicals he needed could all be obtained from sea water right here, but oh, at what cost in time and labour! It was because he shrank from it that he had preferred to go up to the lake. Well, he couldn't face that mountain again, and it was stupid to try to get two water tanks down those slopes. Here he was at least close to unlimited supplies of sea water, and it was just a question of a lot of work at the ship.

He wasn't really fit enough to embark on a big and strenuous enterprise, but the deadline was fast approaching when he would be out of food. His left arm was of little use to him and had to remain in a sling for a couple of weeks more, and he still had to be careful with his back. The outside lift

was no longer in use, and everything had to be carried up or down.

He started setting up equipment in the walled courtyard at the foot of the ship. Two wind generators remained out of commission because he needed the trolley to fetch water from the sea. He wasn't going to carry it in buckets. Using the ship's power and all the solar cells, he fixed up a boiler for evaporation. When summer came it would be easier to provide the heat with electric coils. He added a condenser to catch the steam and recover pure water – that would save him from having to go to the well. He might as well kill two birds with one stone if he had to go to all this trouble anyway. He wished bitterly that he had sufficient pipe to pump the sea water direct to the boiler, but the ship wasn't a plumber's stockist, and what he was doing was the last thing the designers of the ship had in mind.

He drove the trolley to the shore, filled a tank with water, brought it back, filled the boiler and evaporated the water, repeated the process, and so on throughout the day. Then he scraped out several ounces of salt and took it into the ship to separate into its constituents. He spent the next day in the lab gleaning what he needed from the salt. It was disappointingly minute. Getting enough of what he needed would be a continuous task. What with that, and foraging, and looking after the ship, he was going to spend the rest of his life in an endless round of drudgery. He was now at the end of the line, living from hand to mouth, one pace from starvation, condemned to endless work.

The weeks passed and Tansis settled into yet another and harsher routine. He would spend one day each week gathering food, one working the ship, four complete days doing nothing but evaporate sea water, followed by a day of chemical separation in the lab and another processing the food to make it edible.

His health was deteriorating, for the sea food wasn't a complete diet on its own now that the algae was gone. His skin was becoming blotched with light-brown patches and he had sores in his mouth. He often felt listless and sick, and his eyesight was no longer as keen as it had been. Sometimes he had periods of double vision. He noticed that he was

losing a lot of hair. The chronic congestion in his nose and chest had eased a lot after he had flushed the old air out of the ship, but now, even though he flushed it out every month, his nose was always blocked and his cough irritating and persistent.

The small stock of vitamin pills in the medical store had long since been used up, and the only way left was to restart that tank of protozoa he had once cultivated. The sludge processed from that would supplement the sea food and keep him properly fed. He knew, from the experiments he had made at the time, that a pool of protozoa only flourished in something that simulated the pools in the crowns of the ribbon trees. Metal or glass tanks wouldn't work – it had to be wood. He hadn't the materials to make a water-tight wooden tank, and the one he had was as dry as a bone and twenty miles away.

The more he thought about it, the more obvious it became that he would have to move the tank down to the new well, and the route to take was under the ribbon cover along the great continuous cave which the vegetation had made right round the island. He would have to get the trolley inside the cave, jack up the tank, put it on rollers and haul it down. It was no use bringing it to the ship because the protozoa didn't grow in isolation from the vegetation.

He was in a hurry, and used explosives to blast a hole into the swelling mound of ribbon cover at a point exactly in line with the new well and the ship eight miles away. He made a blackened irregular hole ten feet across and drove the trolley straight in. He travelled a third of a mile under the cover to the other side, and blasted another hole so that he could get to the well easily. The tank would be re-sited halfway between the two entrances. He then drove the trolley under the cover north-east towards the tank. It was loaded with jacks, gas cylinders, a generator and tools.

The trolley moved almost silently through the dim greenness at six miles an hour. Tansis was too busy thinking about the big job in front of him to enjoy the beauty of the place, and in any case he was a sick man and constantly tired now. He reached the tank three hours later. It was a massive

thing, bigger than he remembered, and must weigh a couple of tons.

Jacking it up took half an hour, after which he pushed a dozen gas cylinders underneath it and released the jacks. He searched around for traces of his old tower and salvaged the steel wire he had lashed it to the ship with. He used it now to attach the tank to the trolley. At least he had salvaged wire if he did nothing else here.

The trolley was only just strong enough to move the tank along the rollers, and it whined alarmingly as it made the effort. It was now so late in the day that it looked as if he was going to have to sleep out again, but he felt he couldn't give up until he knew for sure whether the trolley could move the tank, however slowly, down to the place he wanted.

The movement was desperately slow, a mere forty yards an hour, and the trolley-motor sounded very rough and ill-used. Forty yards an hour ... at that rate it would take weeks, and he couldn't wait that long. The trolley would probably be completely ruined by then. Besides, the band of cover didn't run along even ground but rose and fell as it followed the hollows and low hills at the base of the mountain. Once the gradient started rising, as it did about half a mile ahead, the trolley wouldn't be able to cope at all.

In the gathering darkness Tansis admitted failure and started back for home, riding on the trolley and using its lights to guide him through the endless forest of trunks as the darkness became total inside the cover. He was tired out and had been in his suit all day, and he felt sweaty and shivery and miserably uncomfortable.

He drove for three long, long hours in the middle of a pool of light with utter darkness beyond and the trunks of the cover slowly opening in front and slowly passing and closing in behind. He fell into a trance for minutes on end as he aimed between two trunks, watched them pass by, aimed between the two ahead, watched them pass ... After three hours he got the homing frequency which passed across the point where he had blasted his entrances into the cover, and turned south to find the entrance. Eventually, three and a half hours after leaving the tank, he was finally

out in the desert, riding along the top of the ridge above the bay and back to the lights shining out from the ship.

Another thankful homecoming and another failure.

Next day he reconsidered the situation. If he couldn't shift the tank then he would have to make one. That meant sawing up hour-glass trees and somehow cobbling up a tank without glue or nails. With good joinery he could do it using mortice joints, but how long would it take? He was too damn weary to go into all that.

The hour-glass trees looked like a tank anyway. Supposing he cut one in half and hollowed it out to make a round tank ten feet across? That was the best thing and he would have to do that, but not today.

That afternoon Tansis went to bed feeling too tired to go on.

It was three days before he could spare the time to ride the trolley to the ribbon cover, single out an hour-glass tree growing ten yards from the entrance, and set up a band-saw and generator before attacking it. His legs ached and he was sweating and shivering and felt he was going to be sick, so he left it all in position, returned to the ship and went to bed for the rest of the day.

After two more days of routine chores he eventually got back to the tree, sawed through it, and then called it a day and went home.

There was a loud knocking coming from somewhere in the water system, and he tried to trace it. An air-lock had formed in the pipes. He had never heard of such a thing, but what with flushing air out and causing a near-vacuum inside once a month, anything was possible now.

Next morning he felt too ill to get up, and he didn't want to eat. He was cold and shivery and his legs kept jerking involuntarily. He lay in a state of resigned misery. There was nothing to look forward to even if he got better – just an endless round of toil, and the round was badly out of schedule now. He hadn't processed sufficient food in the last ten days, and he hadn't got enough reagents for processing. He needed to maintain a tight schedule to keep it all going, and he had to get that tank set up as well. Well, he didn't care just now, he only wanted to rest and rest.

When he did feel a bit better two days later he was practically out of food. Slowly and listlessly he gathered sea food along the shore and saw the sea creatures – a lot of them, perhaps a dozen – slowly moving along with him. He waved and they turned and flicked in answer, but he didn't feel like conversation; there was nothing to say. They stayed with him all the time he foraged and seemed to take no offence because he didn't take much notice of them.

He had to evaporate sea water again and extract chemicals before he could process the sea food. He was really living from hand to mouth now. He didn't feel hungry and had no appetite for the damn stuff he was making; it kept him alive, but it wasn't keeping him healthy.

He sat in his special chair for eating and toyed with the meal. He must have dozed off, for he awoke out of some dream in which the crew were beating his door down to rescue him from something. He looked round blearily and could still hear the knocking. That bloody water system was at it again.

Irritated, he went upstairs to the command cabin. He asked the computer to check through the water system, but the computer produced nothing to explain the thumping that he could hear even up in the command cabin. He asked the computer to check back on its monitoring since the last air-flush, which was about thirty-five days ago, he wasn't sure how long, and tell him the precise time since the last flushing.

'SEVENTY-THREE DAYS,' answered the computer.

Tansis stared in disbelief. 'No,' he typed back, 'that was the last but one. There was one only thirty days ago.'

'THERE IS NO RECORD OF IT,' was the answer.

Tansis didn't know what to think. Was he losing all track of time?

As a possible cure for the water system he ordered the computer to open all valves and taps and let the water run from the storage tanks through the purifiers and back to the tanks until the air-bubble got dislodged.

Still puzzled, he went down to examine the filters in the air pumps. If it was seventy-three days since the last flushing they should be nearly clogged with alien material by now.

Cleaning out the pumps was one of his monthly chores before each flushing. Yet the filters showed that they had been cleaned only a month ago, unless the outside atmosphere had suddenly halved the amount of suspended dust it carried. Then he looked at the purifiers linked to the pumps. There was something wrong somewhere. At first he couldn't recognize it. Then he saw that the operating signal lights were not on. The computer hadn't switched them on with the pumps. How long had they been like that? He hurried back to the computer.

'What has happened to the air purifiers?' he asked.

'THERE IS NO INFORMATION CONCERNING THEIR FUNCTION,' answered the computer.

'They are not switched on. The air pumps are but the purifiers are not. How long has this been going on?'

'PUMPS AND PURIFIERS WERE SWITCHED ON TOGETHER SEVENTY-THREE DAYS AGO. THERE IS NO INFORMATION THAT THEY HAVE BEEN SWITCHED OFF.'

'But they *are* off. Why do you not know this?'

There was several seconds' silence and then the computer answered, 'THERE IS NO INFORMATION.'

'Switch on the purifiers,' ordered Tansis.

'THEY ARE ALREADY SWITCHED ON. THEY WERE SWITCHED ON SEVENTY-THREE DAYS AGO.'

'They are off and were switched off about thirty days ago and were supposed to have been switched on again. When were the air pumps last reversed?'

'AIR PUMPS WERE LAST REVERSED THIRTY-ONE DAYS AGO.'

'Then there must have been an air flush thirty-one days ago and you have omitted to switch on the purifiers with the pumps.'

There was a pause of several seconds.

'THE INFORMATION IN DATA RETRIEVAL IS INCONSISTENT. THE PUMPS WERE REVERSED IN MODE CONSISTENT WITH AN AIR FLUSH THIRTY-ONE DAYS AGO. THEY WERE SWITCHED BACK. THE PURIFIERS WERE LAST SWITCHED ON SEVENTY-THREE DAYS AGO. THERE IS INFORMATION OF FULL CHECK-OUT OF THE SHIP'S SYSTEMS SEVENTY-THREE DAYS AGO AND THIRTY-ONE DAYS AGO. THAT OF SEVENTY-THREE DAYS AGO

INVOLVED AN AIR FLUSH. THE OPERATIONS OF THIRTY-ONE DAYS AGO ARE AMBIGUOUS.'

Tansis felt desperate. The computer was forgetting things, and its memory retrieval was faulty. For thirty-one days the air pumped into the ship had been filtered but not purified. Not that that was a disaster, but the malfunction in the computer was, and the last full check-out of all systems must have been patchy or else the computer did do it all but didn't store the information. The malfunction was probably a small and limited one because the machine was still functioning well in everything else, it answered rationally, and its pulse-wave was steady. But if it wasn't always switching things on or off, then anything could happen on the ship now.

Everything seemed to be crumbling. For a long time Tansis sat in the command seat, head in hands, thinking of nothing constructive. He was too tired and run down to act decisively or marshal his thoughts. He felt anxiety and yet seemed resigned. He didn't know which was the worst problem, or what job he ought to do first. Was it getting more food, or was it making that tank, or was it trying to rectify the malfunction in the computer?

He must have fallen asleep, for it was night when he came to out of a confused nightmare; he had been about to drown in the great expedition ship, which had somehow landed in the ocean and was sinking with everyone fighting to get out. His legs were weak, he felt both hungry and nauseated, and unable to think. He couldn't think about anything, or do anything. He went to his bunk, and dreamed again and again of the ship sinking and drowning in the sea.

The next day he was so feeble that he knew he couldn't do any more work on the tank or dare go far from the ship. Getting food from the shore was exhausting, drawing water and evaporating it was so exhausting that he couldn't do it in the end, and later, in the lab, he made stupid mistakes in the complex chemistry and ruined the food he was preparing. He sat in the lab and cried, and faded away into sleep again.

Later, worn out by the dream of drowning, he stumbled

into the lounge, and with the lights full on and music blaring full blast he lay on a couch and tried to rest without sleeping. But however hard he tried he kept fading away, and again he would dream.

He never knew how long he lay in the lounge, waking and dozing and dreaming – a long time, he thought, hours or even days. Was it unpurified air that was making him like this, all the air he had breathed inside for the past month, or was it the food, or the lack of it? How long since he had eaten? He couldn't remember and he didn't want to eat.

He ought to be making more food, but that was beyond him. He couldn't face the drudgery, the trudging back and forth, scraping out the tank – a hard job, that, and why bother when he didn't want to eat?

What brought him wobbling and trembling to his feet at last was the loneliness of being ill alone. He had to meet them and feel their sympathy. He needed to be cared about. He couldn't go on lying here, afraid to sleep, unable to do anything. Slowly he made his way through the air-lock. The screen in there was showing something and a light was flashing, but he didn't bother with it. Getting down the ladder was terrifying, for he could hardly keep level while he went down and his legs trembled.

He got to the bottom and rested on his knees, staring at the evaporating tank. How he hated it, that treadmill, that terrible factory without pay, without holidays, without joy or future. His disgust and rejection gave him the strength to get up and walk down to the shore.

One of them was there, and for the first time it saluted him without waiting. It swam towards him and then turned and watched. Slowly Tansis walked along the shore and kept on and on until he reached the rock and saw many of the sea creatures gathering in front of him. Then, when he could no longer walk, he crawled along the rock to his accustomed place, the only place where he had found any moment of contentment on this deadly world, and saw a multitude of aliens all around the rock, surely far more then the twenty-two he had known. He was too weary to count them, and what use was it to know the number of this and the number of that? They had all come because they

knew and cared, and that was worth more than a million numbers.

They lay, moving slowly back and forth, gazing into his eyes, and he gazed back and then took off his helmet, that barrier which divided him from this world, and let it fall.

He felt their sympathy and pity pour over him. They knew, as he knew, and yet they did not sorrow. They honoured him, and they were filled with an emotion he couldn't quite recognize. They seemed to be full of an anticipation of something tremendous. They were praying – no, not quite; rather they were in a mystic union with all things, and it was for his sake. They were helping him, giving him strength and hope. He was content and had no fear and no regrets. He was not alone but had many true friends, and he wept.

And there, on the rock at the edge of the sea, he died.

GALACTIC CRUSOE

When an atomic explosion destroys a huge expedition ship, Tansis becomes the sole survivor of the human race. A skilled space pilot he manages to land his scout craft on the nearest planet. The alien world in which he finds himself is not hostile but has no means of supporting human life. Desperate for intelligent contact, Tansis establishes a telepathic relationship with the extraordinary seal-like creatures who live in the planet's oceans. But just as things seem to be going smoothly, the craft computer warns Tansis that the energy supply is running out and he is forced to take drastic measures to safeguard his own survival . . .

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